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SPECIAL SECTION ON MATERIALS HANDLING

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The Importance of Increasing Productivity by W. Averell Harriman Secretary of Commerce

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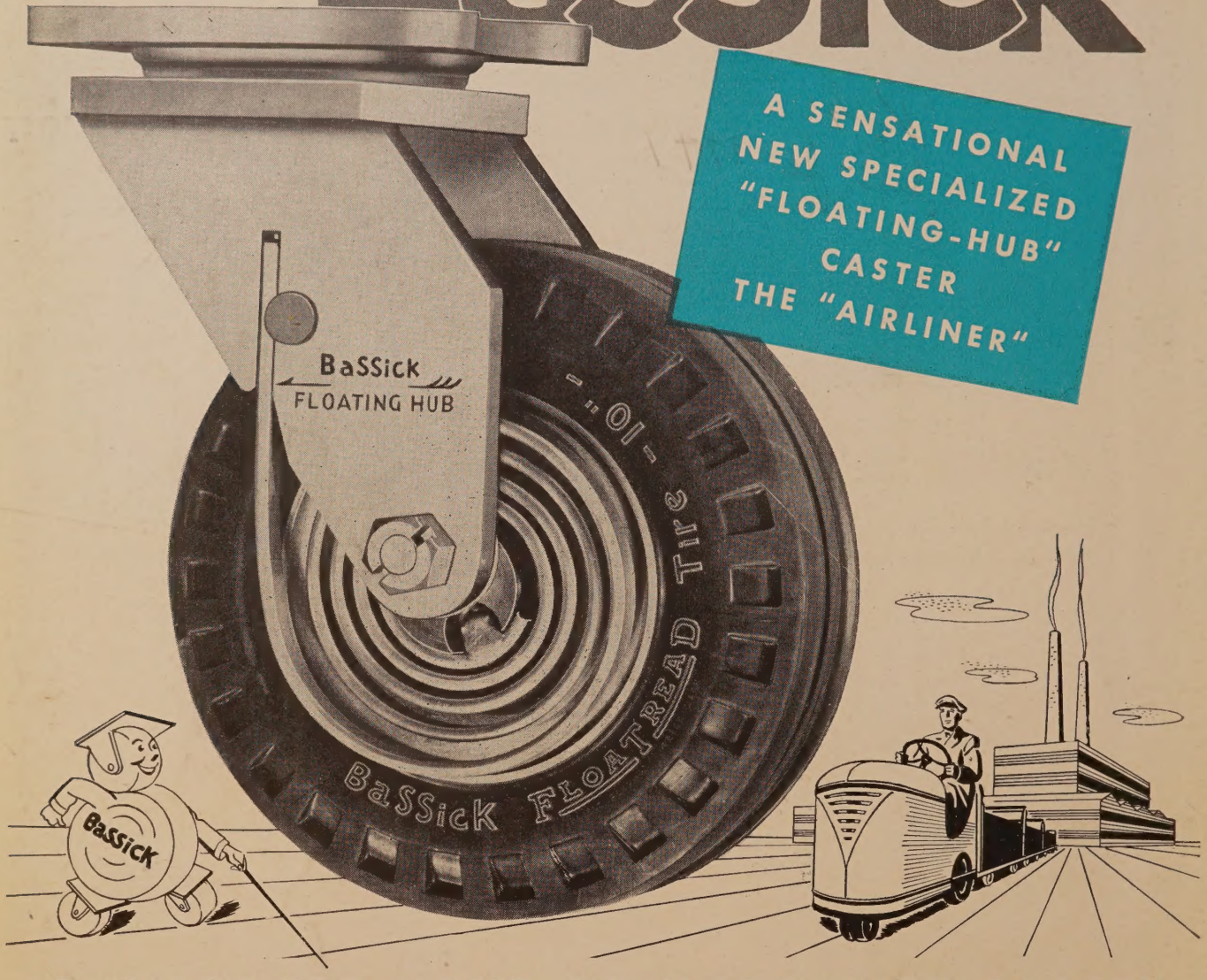

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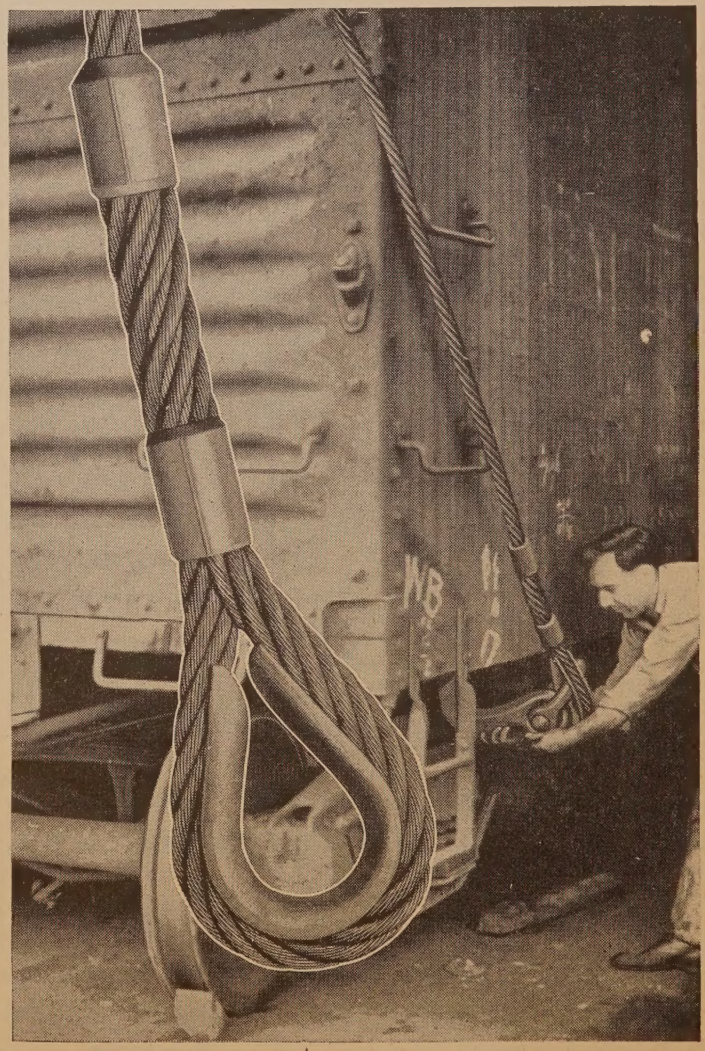

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When Labor Restricts Productivity

IN Great Britain one third of the machines in the textile industry are over 50 years old. Until the last couple of years, there was practically no mechanization of the coal mines. Modern continuous tunnel kilns in the pottery industry are practically unknown. A similar lack of modernization is typical of many other British industries.

Due to the obsolescence of British industry, the American miner digs 6 times as much coal as the British miner; the American pottery worker turns out more than 3 times as many dishes; and the textile worker in America produces anywhere from 2 times to 9 times more than the British worker in similar textile jobs.

The low productivity in Great Britain is a direct result of obdurate restrictive practices of British trade unions, which have blocked the introduction of modern machines and techniques for the past 50 years. To further impede production, in many British industries, as in our own building industry, various crafts jealously guard their moth-eaten rights to perform certain jobs in long outmoded ways.

The result is that British industry not only cannot pay high wages, but cannot compete in foreign trade with the industries of more progressive nations. It has gradually dawned on British labor that in order to exist, their industries must be immediately modernized, and all labor practices that restrict productivity must be scrapped. A continuous stream of trade delegations have been visiting the United States, to study our industrial methods. It is estimated that it will require $600,000,000 to modernize the coal industry; $300,000,000 for the iron and steel industry; and $300,000,000 for the textile industry—sums that cannot be forthcoming from private British sources.

As a final result of British labor's restrictive practices on productivity, we find Britain with a socialistic government and rapidly nationalizing her industries. A huge loan has been obtained from America to make industrial modernization possible. Meanwhile, the British worker continues to receive low wages and the British standard of living will continue at its present low ebb for several years to come.

No more dramatic an object lesson could be given to American industry and labor, as a warning against the dangers of featherbedding and other artificial restrictions on productivity.

Carl C. Harrington

Editor

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A Higher Standard Of Living Depends On Increased Productivity

By W. Averell Harriman
Secretary of Commerce

AMERICAN free enterprise has developed in our democracy hand in hand with our political and personal freedoms.

American enterprise, management and labor alike, has developed methods of production which have made the United States the great industrial nation of the world. We find all other industrial nations looking to the United States to learn our production methods.

We cannot remain static. To maintain our great national heritage we must expand and develop our productivity.

In view of these personal convictions, I have been highly gratified to learn that so many of our leaders of labor and industry agree on the need for increasing the productivity of our industry.

This agreement did not surprise me, since it is a basic tenet of economics that high productivity makes it possible for all to share in the goods and comforts we are capable of producing. Our progressive labor leaders fully understand these facts, in the same measure as they are apparent to industrialists.

This agreement on general purposes is a natural one. Suggestions on how this purpose may be accomplished cannot help but lay the groundwork for the greater effort of both labor and management in producing more goods.

It is only through such production that we can hope to sustain and improve the American standard of living which we prize so highly.

WILLIAM AVERELL HARRIMAN, who became Secretary of Commerce in October, 1946, has served in various government posts since 1933 when he was made chairman of the New York State Committee of the National Recovery Administration. Later he became administrative officer of the NRA, then served as chairman of the Business Advisory Council for the Department of Commerce.

After inauguration of the Defense Program in 1940, he served in a variety of capacities with the National Defense Advisory Commission and its successor, the Office of Production Management, becoming chief of the Materials Branch in the Production Division of OPM in January, 1941. In March, 1941, he was appointed President Roosevelt's special representative in Great Britain on all matters relating to the facilitating of material aid to the British Empire. Later that year he was appointed chairman of President Roosevelt's special mission to the Union of Soviet Socialist Republics. Thereafter the Harriman Mission was concerned with material aid to the USSR as well as the British Empire.

In October, 1943, Mr. Harriman was made ambassador to Russia and served in that post until February, 1946. In April, 1946, President Truman named Mr. Harriman as ambassador to Great Britain, and six months later called him home to become Secretary of Commerce.

Mr. Harriman's private industry affiliations have included chairmanship of the board of the Union Pacific Railroad which he resigned last October, and director of the Illinois Central Railroad which he also resigned in October. He is a limited partner of the private banking firm of Brown Brothers Harriman & Co.; was formerly a partner of the Guaranty Trust Co. of New York, and a director of Western Union Telegraph Co. and Weekly Publications, Inc.

We often do not realize what a huge asset our existing productivity is. American workers in some lines can produce in one day what workers overseas produce in a week. It is only natural, therefore, that all industrial nations are attempting to learn our production methods. But the very heart of our productivity is the fact that we are ever moving forward.

The disparity between these periods of time required for producing a given quantity of goods is the result of mechanization. We have mechanized and modernized and our workers have blended their efforts to the tempo of the machine. Their day's work is not more laborious than that of the foreign worker; it is simply more effective.

Produce More in a Day

That is the heart of this matter of productivity. A day's work, with us, produces more. Both management and labor get a greater return for the day's work, because the day's work produces more. We enjoy more comforts because our work creates more comforts.

In a real sense, we have come to a turning point in our productive history.

The period of readjustment from war, naturally, has been lengthy and difficult; but through it all we have confidently looked forward to the creation of goods and services in a higher volume than we ever knew before. We have taken it for granted that our productive machine will be able to keep pace with our desire for goods no matter how great that desire may be.

But we need to remember that a good deal of this is anticipation. Our economy is not yet fully readjusted to peace. Furthermore, there is not going to be anything automatic about that steadily rising tide of production. The mere fact that our production capacity and rate now lead the world is no guarantee for the future.

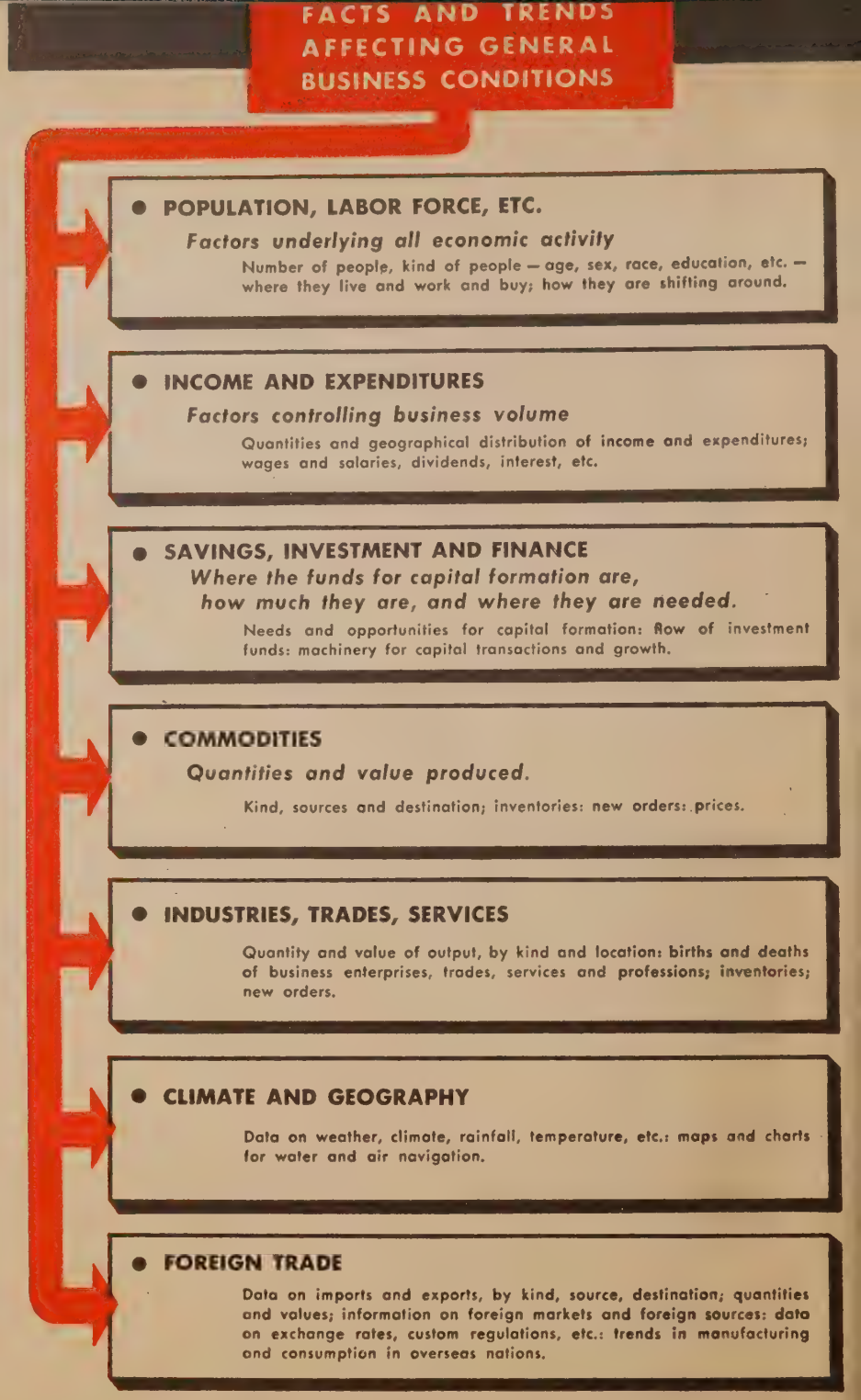
For the rate of productivity has to keep on going up if we are to satisfy our demands. We now have a peace-time peak in employment; but will this high level of employment produce enough goods for our need and comfort? Will all of these man-days of work be translated into the increased supply of necessities, comforts and luxuries which a rising standard of living will demand?

There is the challenge of this post-war era. If we falter in our approach to production—if our production techniques do not increase our output per man-day of work—then our standard of living will not go up, our wage structure will sag and the level of employment will decline.

Both labor and management accept the basic approach toward increased productivity and are anxious to work toward the objective of greater production. Certainly there are differences on current wage and price levels during the period of post-war adjustment, but over the long pull the objectives of both groups are not inconsistent.

High Wages Require High Productivity

For high wage levels can be sustained if they rest on a steadily rising volume of production. We can continue to have high wages, high-level employment and sustained, ex-


FACTS AND TRENDS AFFECTING GENERAL BUSINESS CONDITIONS
● POPULATION, LABOR FORCE, ETC.
Factors underlying all economic activity
Number of people, kind of people — age, sex, race, education, etc. — where they live and work and buy; how they are shifting around.
● INCOME AND EXPENDITURES
Factors controlling business volume
Quantities and geographical distribution of income and expenditures; wages and salaries, dividends, interest, etc.
● SAVINGS, INVESTMENT AND FINANCE
Where the funds for capital formation are, how much they are, and where they are needed.
Needs and opportunities for capital formation: flow of investment funds: machinery for capital transactions and growth.
● COMMODITIES
Quantities and value produced.
Kind, sources and destination; inventories: new orders: prices.
● INDUSTRIES, TRADES, SERVICES
Quantity and value of output, by kind and location: births and deaths of business enterprises, trades, services and professions; inventories; new orders.
● CLIMATE AND GEOGRAPHY
Data on weather, climate, rainfall, temperature, etc.: maps and charts for water and air navigation.
● FOREIGN TRADE
Data on imports and exports, by kind, source, destination; quantities and values; information on foreign markets and foreign sources: data on exchange rates, custom regulations, etc.: trends in manufacturing and consumption in overseas nations.

WHAT THE DEPARTMENT OF COMMERCE CAN DO FOR YOU

The Department of Commerce is a service agency, with the primary purpose of providing information on business conditions and methods. The general purpose is to stimulate all levels of commerce to greater efficiency, and in so doing, create a maximum volume of trade and business. Activities of the Department of Commerce fall into three general categories, as shown below:

FACTS AFFECTING THE COMMERCIAL AND MARKETING FUNCTIONS OF BUSINESS

- **MANAGEMENT METHODS**
  Production, Distribution, Service Trades, Others
  Operating ratios, profit margins, plant requirements, sources of raw materials, trade association aids, distribution channels; counselling on new enterprises; information on successful management methods.

- **RELATIONSHIPS TO THE NATIONAL ECONOMY**
  Relation of company and industry to the National Economy.
  Studies of the effect of national economic conditions on business, by type and location; capital requirements in relation to available funds for investment; inventory trends.

- **RELATIONSHIPS BETWEEN INDUSTRIES**
  Developments in given industries and their effect on other industries; effect of new products and processes; effect of industrial shifts in location; effect of population movements; effect of business policies.

- **MARKET STUDIES**
  Location, character and size of markets; changes in consumer buying habits; new products and processes and materials; population movements; development of under-industrialized areas; effect of price changes on markets; transportation differentials.

- **FOREIGN TRADE**
  Counselling on areas, requirements, preferences, customs, etc.; information on established firms and channels; assistance on import and export controls; foreign sources of needed imports.

FACTS AND SERVICES CONCERNING TECHNICAL DEVELOPMENTS

- **NEW TECHNICAL DEVELOPMENTS**
  Products, processes, materials.
  Foreign developments: captured reports and patents, U. S. developments, secret in wartime.
  Results of research and testing.

- **TECHNICAL MANAGEMENT PROBLEMS**
  Procedures, methods, technical organization.
  Instruments, special devices.
  Effects of temperature, humidity, light, color, etc.

- **STANDARDS AND TESTING**
  Products, processes, and materials.
  Standards and standardization.
  Industry-wide codes for quality, size, etc.
  Minimum requirements for strength, durability, etc.
  Assistance in standardizing building codes.
  Research and testing for new developments of wide promise.

- **ENCOURAGEMENT AND PROTECTION OF NEW DEVELOPMENTS**
  Fostering new opportunities for business improvement and for new enterprises.
  Patents and trademarks.
  Guidance on patent procedure.
  Study of needs and opportunities for new developments.

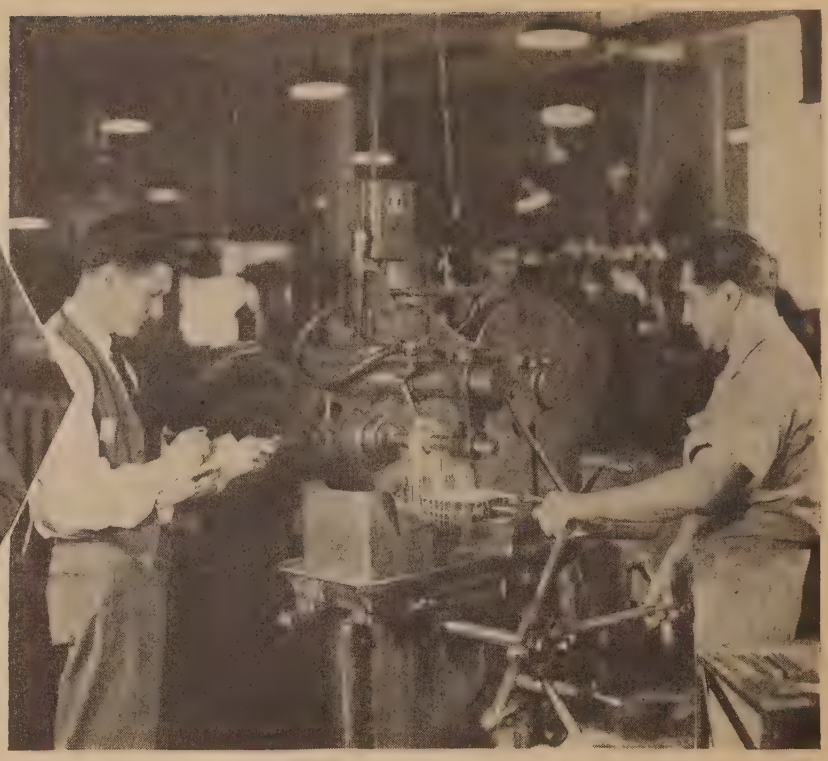
panding purchasing power, *if* there is a steady increase in productivity.

The demand for our products stretches ahead over a long period. To replace what we lost in civilian production during the war will take several years. Beyond that, we have an almost limitless market for our labors in constantly improving our living conditions and raising our national living standard. Living standards always rise when man's ingenuity enables him, in his day's work, to produce his daily bread plus something more. It is that "plus" factor that we need to increase. We can do it if we exert a common effort toward a common goal.

The job of increasing production is one that labor and management, working together, can accomplish. It is not a role for government. Government can offer certain services, and those services which have been developed by the Department of Commerce are outlined in the accompanying chart.

But the real firing line of production is at the plant level. The real challenge in the present situation is to enlightened leadership and intelligent self-interest of management and labor alike.

1. Apex incentive system began when President of the Company C. G. Frantz showed Ted Mills, the union steward, that the Company was writing in red ink. "We can't continue on this basis," said President Frantz.



2. There had to be some correlation between wages and production—so an incentive system was agreed upon. A new wrinkle was introduced in that the time study men are members of the union. Louis Gammiere making a time study of Tommy Joseph's job. Gammiere's comment is that "There are no complaints". Speaking for himself, Tommy says, "It's all right. You make more money."

Labor TIMES THE PACE For Incentives

BRIEFED: An example of sincere cooperation between labor and management in order to pull a company out of the red. This was done by the establishment of an incentive system in which all time studies are made by union men. The results have proven most gratifying to both management and labor.

By A. N. Weckster

3. Before a time study becomes effective, the operator of the machine must personally sign the study. This serves to eliminate squawks later. Russell Uthe, executive committeeman for the Union, tells Tommy where to sign, while Phil Tanski, time study supervisor, looks on.

4. After the time study, comes the matter of negotiating a standard. L. C. Cook, head of time study and methods department, takes his job over himself. He uses tact—is friendly and cordial. He lights a cigarette for Andy Milenock, turret lathe operator, with Pete Gammiere, member of the union executive board, sitting in on the proceeding.

A NEWS item on the financial page of The Cleveland Plain Dealer gives as a year-end summary the following important development:

"Unit production of vacuum cleaners, washing machines and ironers has reached an all-time high in the Cleveland and Sandusky plants of The Apex Electrical Manufacturing Co."

This is but part of the story. Union newspapers have lauded a system of incentives which the Apex Company has been offering for the past several years. The national publication of the International Association of Machinists has come out flatly with a testimonial concerning the Apex incentive system. There have been repeated items in the "Cleveland Machinist," the official monthly publication of District 54, International Association of Machinists, all highly laudatory of the incentive premium system at the Cleveland company plants.

To make this trilogy complete, the sales executives at Apex think the incentive program is wonderful. They have something to sell now when the public is clamoring for washers and ironers. Later, when the market turns more selective, they feel that they will be in a better competitive position. They are hopeful that the incentives will give them a cost advantage over their competition.

It wasn't always all sweetness and light at the Apex plants. There was a day several years ago when C. G. Frantz, president of the Company, was faced with a difficult decision. The Company was losing money. There was red ink on his books. He called in the union leaders, and told them that he couldn't and wouldn't take any more of a high-cost, limited price and production formula that was ruining his business. Frantz went pretty strong. He isn't willing to repeat the exact words, because that is water over the dam. The man he talked to was Edward (Ted) Mills, President of Local 1130, IAM, and the shop steward at Apex.

Mills admits that Frantz was really bearing down, but he is happy about it all now. The incentive system is working out well.

There are discussions and differences between the management and the union, but they are ironed out at an operating level.

Type of Plan

The basic incentive plan used at the plant is of a standard nature, having been worked out by a firm of management engineers.

The plan provides for a 50% premium for the labor value of the time saved for efficiency over 100%. This premium is in addition to the base rate of pay.

In establishing standards for the 100% efficiency level, time studies are taken, and working times per unit of production are set at what is considered the performance of an average operator working at a normal pace for an entire work shift.

Workers are paid ½ of 1% incentive for each 1% of efficiency in excess of 100%, multiplied by the individual's base rate. If perfor-

5. The incentive plan is popular with indirect labor too. They are in on it. George Hall, a dispatcher, says, "The more these fellows produce, the more we get. It means $10 a week to me, a real incentive to see they get the right stock at the right time."

6. Sales executives think the plan may give them an advantage when it comes to selling. It will keep costs down. A. C. Scott, vice president in charge of sales shows J. C. Thomas, Southern Division Manager, the gear case mechanism that was holding up deliveries on washers. The incentive plan stepped up output of certain parts and made it possible to get more products out to the field for sale to consumers.

mance falls below the standard, workers are still guaranteed their hourly base rates.

This is all standard procedure up to this point. At Apex, there are several new wrinkles. First of all, the procedures in establishing standards take on a new and novel approach.

The time study men were carefully selected for this job on the basis of extensive psychological tests, but they were chosen from the working forces, and were union members.

There are five men who are making the time studies. They were trained at the company's expense in an intensive six-month's course at Fenn College, Cleveland.

The important element in their relationship in the plant, however, is their union membership. This factor eliminates complaints by machine operators. They can argue against the standards established for their individual operations on the basis of error made by members of their own union. The company's integrity never comes under question.

In charge of the time study and standards procedure is Linneaus C. Cook, who, heads the Time Study and Methods Department. Under him is a supervisor of time studies.

Cook and his supervisor check the time studies which are made by the union member time study men. They can make a check on past time studies and similar standards. They understand that their job is purely a technical one. The workers in the plant understand this, too.

Before a time study is accepted by Cook and his department, it must be demonstrably reasonable. If not, the time study man is called in to justify his study in the same manner as if he were a member of the non-union supervisory staff.

The questioned time study is examined, and if necessary, there is a repeat on the study.

The majority of the time studies are not questioned. The time study men become more scientific and apt in their work as time goes on.

Standard Accepted by Operator

When a time study is accepted by Cook, it is then shown to the machine operator on whom the time study was made. He must sign it, showing his acceptance, before it becomes a valid basis for negotiating a standard.

The standards represent the time required to do a given job, including all necessary allowances, using proper machines, tools, jigs, fixtures, feeds and speeds, gages and materials, working to definite specifications, and with the operator working at a normal rate of performance under normal conditions.

Allowances are made to provide time for personal needs, fatigue, unavoidable delays and other conditions which are necessary for the proper accomplishment of the task.

When a production time has been set on an operation, the Production Standards cannot be changed without justification on one of the four following reasons:

1. Change in method.
2. Change in equipment or material.
3. Work added to or removed from the operation.
4. Change in quality or finish requirements.

Actually, there is considerable give-and-take in establishing a standard—and in altering one—once it is established.

All direct labor is covered under

2 THE CLEVELAND MACHINIST

The Cleveland Machinist

Cleveland, O., July 1, 1945

Published Monthly for the Members of District 54, International Association of Machinists

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Shop news and contributions must be sub... the 20th for publication in next month...

Peddlers of Poison

When the storm is over, th... out of their holes. And last m... nd was treated to a close-up Cl... s expose of a couple big-timers w... verai plants here to raise money in... the so-called Nationalist Party.

The two visiting ... artists were Joe "McNazi" McWil... nfamous 'fuehrer' from Yorkville, ... mpaigned for Congress on an ar... ro-Nazi program and who current... dictment for sedition; and J. Victo... o sells 'subscriptions' to the Nationali... publication of ex-Senator Robert R. Reynol... scist party which he calls the "American N... onalists."

These two are out for blood; they talk in terms of thousands of dollars at a whack, not peanuts. They are dangerous. They carry a "prospectus" of Fascist America in their briefcases. And one of their main selling points is a strait jacket for labor.

... siren's song to the busy...

Union, Company Co-Operation Built Apex Incentive System

The incentive system at Apex Electrical Mfg. Co. really is an example of practical, down-to-earth labor-management co-operation.

It has set a new milestone in industrial relations. It has set a goal for unions throughout the nation to shoot at. And it has put fear in the hearts of industrialists who don't believe in industrial democracy.

This plan, which has increased production and profits for Apex and has boosted income for its workers, was worked out together by labor and management and is jointly administered by Lodge 1130 and the company.

Here's how it started:

In August, 1943, C. G. Frantz, company president, called a meeting of union and company officials to discuss the status of production and earnings. Representing IAM at this meeting were Matt DeMore, president of District 54; Nick Charo, business agent; Edward Mills, shop steward, and the shop executive committee.

Mr. Frantz discussed the firm's financial condition frankly and in detail. He invited the union to examine the company's books. Then he told them that for Apex to prosper and afford full, profitable employment to Lodge 1130 members, more production and greater efficiency was needed.

Cards on the Table

Apex's problem was not unique, only its approach to that problem. Apex called in the union, laid its cards on the table and asked labor t help it lick the problem.

Management suggested that the union work out a plan to increase production and to increase earn... ... members. And for the ticket—and it works.

In January, 1944, final details of the proposed system were completed and explained to all employes in a 9-page letter. One paragraph said:

"To aid both the company and the union in arriving at a plan that would best suit the interests of all concerned, we called in the engineering firm of Stevenson, Jordan and Harrison to make an impartial survey and to make recommendations regarding the installation of a wage incentive system . . .

"We told them that we were in agreement that any incentive plan . . . we might propose . . . must be fair to the workers, must be based on sound elemental work standards, must provide an increase in hourly earnings for a worker producing at an incentive pace, and must reduce costs through more efficient use of facilities and increased production."

Main Points of Plan

The plan was explained as follows:

Production standards would be set on all jobs lending themselves to time-study.

All production workers would be paid incentive on their individual or group efficiency.

Indirect labor, such as truckers and laborers, attached to production departments would be paid incentive based on the average of their departments.

Indirect labor, such as carpenters and electricia... not ...

Union newspaper talks up Apex plan.

the 50% premium incentive plan. The incentive bonus is based on either their individual or group efficiency as determined by time standards.

Indirect labor is paid a fixed incentive that is relative to, but somewhat less than, the average productivity earned incentives.

The crux of the Apex Incentive plan, according to the Company officials, is the mutual confidence between management and the workers, and to this the union leaders agree.

An integral part of this trust is the use of union time study men.

Company officials point out that this feature of the plan has aroused considerable discussion. The question has centered on whether workers should see time study forms; if they should be educated in techniques of establishing standards and rates.

To this, the Company reply is that once time studies and standards have been reduced to an understandable scientific basis, it is a definite advantage to have everyone concerned fully understand the workings of an incentive plan.

There is considerable camaraderie between Cook, the management's man on standards, and Mills, the shop steward. Their offices are side by side. They swap cigarettes and yarns. They bet against each other on the outcome of football games.

This goes for the plant, too. Cook will take a chew of tobacco from one of the workers in the plant. When they come into his office, they smoke one of his cigarettes. He lights it for them, too.

Future Prospect

What happens when business gets competitive? When work slackens? This is always a question when it comes to establishing an incentive plan.

There is no mention of the incentive system in the labor agreement between Apex and the IAM, but there is a clause which covers a reduction in working hours. This reads as follows:

"When it becomes necessary to reduce expenses or reduce production in any department, the hours worked in such department shall be reduced to 32 hours per week before the force is reduced."

What will this mean insofar as the incentive system is concerned? Obviously, with hours of work reduced, workers will seek to boost their take-home by getting a higher take in their hourly wage. This will accelerate the incentive program, rather than slow it down.

Usual result of a lessening demand for output is a cut in hourly output by workers seeking to spread the work over as long a work week as possible. This trend creates a cycle of increasing cost of manufacture, a lessening of sales, and further lay-offs.

Under the incentive plan, the pressure toward maintaining a higher take-home pay would mean acceleration of unit production, decrease in unit costs, and a resultant boon to the sales department through lower costs. This would permit a cut in sales price and result in the increase of sales, and reverse the spiral so that full production could again be resumed.

Still another factor which the Apex management takes into account is the fact that the basic hourly wage in the Cleveland area is one of the highest in the country. Their products are in competition with those of plants located in comparatively low wage rate areas. The only economic answer to this dilemma is a higher output per man-hour of work.

The union leadership in Cleveland, or at least some of them, realize this, too, and as a result there is a greater acceptance of the practice of incentive production than in some other sections of the country.

At the Apex plant, there is the feeling that incentive payments constitute one answer to the problem of overcoming high hourly wage rates. Incentive to workers, coupled with continued modernization of equipment, is the total answer.

And for both these objectives, good labor-management relations are needed. That is their story.

The successful functioning, say company officials, of the entire system lies in the determined policy of top management, that personnel relations be based upon the fundamental belief in the sincerity and honesty of the workman.

The end result has been secured by a relentless drive to require that supervision recognize personal dignity and human reactions in all dealings. This must translate itself specifically into a fair and just reward for individual performance.

Knowledge of this company policy has been carefully passed on to all employes.

Plant Control Stations

By Charles Delmar Townsend Process Engineer

PRODUCTION control and its value to present day industries has been discussed many times. It is quite apparent that any company establishing a department whose sole responsibility is the controlling of the product through manufacturing processes within the plant is better able to meet its competition. Production control operational setups are as varied as the industries that use them. Each company, often through trial and error, finally arrives at a program that fits all its needs in controlling the productive flow of its product. Frequently this final outline of operation includes the establishment of control stations throughout the plant. The following plan can be considered basic for operating these stations and can easily be adapted to any industry.

Requirements of Station

1. A control station shall be established in each department that operates on a Production Order System.

2. Each station shall be supervised by at least one production control man who will be responsible to the production control manager.

3. Manufacturing schedules are made each month by the Planning Department and these shall govern the function of the control station.

4. Production orders will be released to the control stations by a pre-determined schedule established by a Production Planning and Production Order Section.

5. The Production Control Department prior to putting orders into process will check the material requirements on the order with the Stores Department one week in advance. Therefore, at any one date there will be sufficient material available for one week's work within that department based upon the orders released to the department by the Production Order Section. If any items, i.e., raw material or subassemblies, called for on the order are not available, a report will be made to the production control manager who, in turn, takes the necessary steps to alleviate the shortage.

6. Each Production Control Station will be responsible for seeing that individual pieces making up an assembly are placed in process prior to the issuance of the work order on the assembly if it so happens that both items are manufactured in the same department.

7. The production control man will check with the foreman of the department each week to plan the following week's work. Close cooperation must be maintained between the foreman and the control man.

8. Once the weekly schedule has been set up for the department, nothing except an emergency should disrupt the program.

9. A control chart shall be placed in each station on which all production orders are listed as received by the control station. This chart will also indicate the progress on all the orders within the department.

10. When a particular operation or series of operations has been completed in one department, the work order and parts must then be routed to the next department. The control clerk will check the shop copy of the production orders to see that it has been filled out properly in his department. Contact will then be made with the expeditor or dispatcher who will immediately move the parts into the next department. The parts and the production order must be personally delivered to the next control station clerk by the dispatcher. This clerk will immediately check the order against parts received and will properly schedule the order so it will be completed and reach the Stores Department on the date designated by the Planning Department.

11. A bi-weekly report is required from each control station indicating all production orders held up for lack of raw material or manufactured parts that will prevent the order from being completed within the scheduled time. These reports are submitted to the production control manager who takes action to expedite the critical items.

12. Each department or station will be supplied with a component breakdown of all parts manufactured in that department. This list will indicate those items that must first be produced before any type of an assembly can be placed in production.

The manufacturing schedule set up by the Planning Department is usually a weekly program while that required by the Production Control Stations necessitates a daily flow of work into the manufacturing department.

Once the location of the Production Control Stations within the plant are established, clerks operating these stations follow a more or less set procedure. Basic principles of the work to be accomplished by a production control clerk are outlined in the following procedures.

The primary function of a production control station clerk is to expedite the flow of either purchased parts or those being manufactured in the plant into the stockroom. In order to operate efficiently, he must place production orders in work in his department the moment such orders are available. He must assist the production foreman to obtain any necessary material, engineering data, procedures from the Planning and Scheduling Department, tools and jigs, or assist in any other way that will obtain prompt action on the production order. The clerk must know the current status of all production orders in process in his department and report all reasons for delays to his supervisor.

Procurement of the finished parts or portion thereof at the earliest possible moment, obtaining the necessary inspection, and supervising the delivery of the parts to the next department designated on the routing of the order are important functions. The control clerk must actually count the number of parts being delivered to or being sent from his department to insure that the quantity noted on the production order is correct.

Procedure Clerk

Upon receipt of a production order designating that operation #1 is to be done in your department and a material requisition covering

the material and/or parts necessary, you will:

Record in columns 1, 2, 3, and 4 on your Station Tally Sheet the information required.

2. Deliver the production order and attached material requisition to the shop foreman calling his attention to the scheduled time for completion. If the required material and/or parts are not immediately available in the Stores Department, advise your supervisor at once of all details concerning the shortage. If the foreman advises that the scheduled date for completion cannot be met, notify your superior of reasons for the delay.

Upon receipt of a production order accompanying parts into your department for work designated on operation #2 or any operation higher than #2, you must check the quantity of the parts received against the quantity shown on the production order; record the receipt of the order in columns #1, 2, 3 and 4 on the Station Tally Sheet, and deliver the production order and parts to the shop foreman calling attention to the scheduled date for completion. If the foreman advises of a delay, report all details to your supervisor immediately.

Be able to report the actual status of each order in production at all times. Orders covering parts or assemblies known to be urgently needed are to be under constant observance. Any delays must be reported to your supervisor at once.

Upon completion of work by your department on a production order you will:

1. Check the quantity of parts produced against the quantity called for by the production order and tell the foreman of any difference.

2. Obtain an inspection stamp on the operation completed by your department and check the exact quantity accepted by the inspector. Dispatch these parts to the next operation.

NOTE: Be sure the inspector has indicated the exact quantity accepted in the proper column on the back of the production order. All rejected parts become your responsibility. Inspection will not show the quantity rejected on the shop order which will accompany the accepted parts to the next operation.

3. Transfer accepted pieces from your department to the next operation designated on the production order either using material handlers or, if necessary, actually move the parts yourself. Be sure that the production order properly signed by your foreman and stamped by the inspector accompanies the parts to the next operation. Make a record

Improve Production Control Efficiency

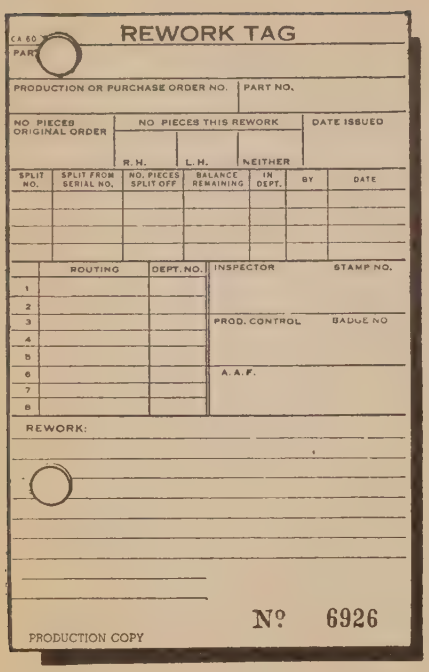
BRIEFED: A basic plan for operating control stations throughout a plant which has set up a production control operation is presented here. It is one which can be adapted to any industry.

DAILY STATION REPORT- DEPT NO. 10

NAME _____ SHIFT Night DATE Feb 15 1945

1. PRODUCTION ORDER NO.	2. PART NO.	3. PIECES FINISHED	4. DISPOSITION OF PARTS FINISHED TODAY AND CURRENT STATUS OF BALANCE DUE ON ORDER.
H63-01-1	2933	50	Split A To Dept H Bal. of 100 in work.
Split B 501-06-2	2801	150	To Dept H
H61-06-1	2447	100	To Stores
RW 1005 506-41-2	2726	25	Split A To Stores Bal. of 25 held up Broken Jig
RW 6271 H95-02-1	2700-1	25	To Stores
H05-20-3	2820	50	To Stores 50 rejected on Split A
H07-H0-1	2700	50	Split A 50 To Dept H 25 pcs rejected on Split AA Bal. of 25 Still in Work
H70-60-2	2807		In Work

Form by which station clerk advises record repartment of orders moving thru his department.


CA 60
REWORK TAG
PART
PRODUCTION OR PURCHASE ORDER NO. | PART NO.
NO. PIECES ORIGINAL ORDER | NO. PIECES THIS REWORK: R.H. L.H. NEITHER | DATE ISSUED
SPLIT NO. | SPLIT FROM SERIAL NO. | NO. PIECES SPLIT OFF | BALANCE REMAINING | IN DEPT. | BY | DATE
ROUTING | DEPT. NO. | INSPECTOR | STAMP NO.
1
2
3
4
5
6
7
8
PROD. CONTROL | BADGE NO
A. A. F.
REWORK:
Nº 6926
PRODUCTION COPY

These tags are recognized as regular production orders, but must be approved by the supervisor.

of the movement of the order on your Station Tally Sheet under column #5. Record movement of this order on your Daily Station Report.

If the next operation is designated as Stores Department, be sure that the storekeeper stamps the Production order properly and returns it to you for a final check. You will then return the completed production order to the Planning Department.

Splits

Although production order Splits are undesirable, they are sometimes necessary. A production order in process in your department may be only partially completed on the scheduled completion date. The completed portion might be necessary for continuing production. Should this be the case, obtain the completed portion of the order and write a Split Production Order to cover the quantity of parts finished.

When writing a Split Production Order, use the Split form and accurately copy the original production order in every detail except for quantities involved and the material. For quantity, show the actual number of pieces being split from the original order, then name the Split, indicate the date and sign your name.

Splits are named A to Z in alphabetical order as they occur until the balance remaining in the original production order can be filled by use of the original order. Each time a Split is written a record must be made of this procedure on the face of the original production order in the space provided in the upper left corner. This is a means of determining the balance still unfinished on the original order.

The Split Production Order is given to the Inspection Department with parts to be inspected. That Deparment stamps the back of the order and indicates the exact quantity accepted. The Split is then transferred with the accepted part to the next operation. The rejected parts are to be handled under Rejections.

Record on your Station Tally Sheet under column #5 the fact that the Split was made, indicating the Split name, date, quantity of parts covered by the Split and the destination. Record this information on your Daily Station Report, adding information regarding the current status of the balance due on the original production order.

It is possible that the production order in process in your department is already in the form of a Split. To procure a completed portion of the order, it is permissible to write a Split from a Split. Using the Split order in process exactly as you would an original order indicate in its upper left corner the information that a further split was necessary. Should the order in process be named Spilt A, the first split from that order would be named Split AA. The second from Split A would be Split AB, etc.

Rework Tags

You are not authorized as production control clerk to write a Rework Tag. Should you be requested to do so, call your supervisor. A Rework Tag when properly filled out is to be recognized as a regular production order. Rework Tags will always be accompanied by parts needing rework to change their specifications or to complete them for Stores.

Upon receipt of a Rework Tag and the accompanying parts you must:

1. Determine that the quantity of parts agrees with the quantity marked on the Rework Tag. Do not accept an order until any difference is corrected.

2. Record receipt of the order in columns 1, 2, 3 and 4 of your Station Tally Sheet.
NOTE: In column #1 show both the original production order noted on the Rework Tag and the Rework Tag serial number, i.e., (RW 6067)

3. Deliver the Rework Tag and parts to the shop foreman.

4. When an order has been completed, present the parts and the Rework Tag for the necessary inspection. Check quantities and determine that proper column is used when being stamped by the inspector.

5. Transfer the accepted parts and Rework Tag to the next operation. Handle the rejected parts as instructed under Rejections. Record the movement of the order on both the Station Tally Sheet in column #5 and on the Daily Station Report. If you are called upon to procure only a portion of a Rework Order, you will write a Split, using a regular Rework Tag form. In this case accurately copy each item shown on the original Rework Tag except for the quantity you are going to move and the authorizing signatures. In the space provided for these signatures write "authorized on original Rework Tag #000." Sign your name directly under this notation along with the date. Indicate in the space provided on the face of the original Rework Tag that a Split was made.

Occasionally an order completed in your department is not acceptable to the Inspection Department but would require only a minor alteration to be acceptable. The order may be returned to the shop foreman on the original order. A Rework Tag is not necessary. The foreman carries out alteration work designated by the inspector and you again present the parts and order to the Inspection Department.

Station Tally Sheet

The Station Tally Sheet is the only record of a permanent nature to be maintained by the production control station clerk and must be absolutely accurate. This type of bookkeeping does not allow you to correct omissions and errors after a movement of the order from your department. The Tally Sheet always remains in the station and is used by all shifts if two or more shifts are maintained.

Every order that you receive must be listed in columns #1 2, 3 and 4 immediately upon receipt of the order. Do not attempt to list production orders in any sequence, merely list them as received.

If the order when received in your station is in the form of a Split, include in your space in column #1 the notation that it is Split A or Split B, etc.

If the order received is in the form of a Rework Tag list in column #1, include both the original production order number indicated on the Rework Tag and the Rework Tag serial number.

Upon completion of the order by

your department and after the necessary inspection has been made, make a record in column #5 of the disposition of the order. Show the date of completion, number of pieces which were accepted and transferred and also the department to which the parts were sent. In the event that a portion of the order was rejected by inspection, include this information in column #5. Always show the quantity rejected and the name of the Split on which the parts were moved to the Salvage Department.

When an order listed on the Tally Sheet has been completely filled and notations made as to disposition, draw a heavy line through the production order number in column #1.

Daily Station Report

The Daily Station Report form is the production control station clerk's only means of advising the Records Department of the movement of orders through his department each day. The Records Department uses this information to post to the permanent records file. This report must be delivered to the Production Control Supervisor from each Production Control Station at the end of each shift.

Upon completion of an order in your department and immediately after you have obtained the necessary inspection on these parts, all information regarding the movement of the order should be noted on the Daily Station Report.

This information must check exactly with the entry made on your Station Tally Sheet which also should be entered at the same time. During your shift you will be recording the movement of all orders on both of these forms. At the close of your shift, refer to your Station Tally Sheet and list each production order number that has not been fully completed and crossed out in column #1. Indicate the exact status of these orders in process and obtain the estimated date of completion from the shop foreman.

Rejections

When a production order or Split thereof is completed in your department and the inspector has indicated with red rejection tags those parts he does not accept, you will:

1. Make sure that the inspector has indicated on the back of the production order the exact quantity accepted. He will not indicate the quantity rejected.

2. Write a Split covering the quantity rejected. Copy accurately all information on the original production order except for the amount and material. Be sure to name the Split as outlined under Splits including the date and your signature. Make a note in large letters REJECTIONS TO SALVAGE. Be sure to show on the original shop order the information recording the Split and indicate under the operation that the Split went to Salvage.

3. Transfer the rejected parts and the Split Production Order to the Salvage Department.

NOTE: The original production order is always sent on to the next operation with the accepted portion of the order.

4. Indicate on your Station Tally Sheet the quantity of accepted parts sent along with the original order and note the quantity of rejected parts sent to Salvage, also the name of the Split on which the action was taken.

5. Place the same information on your Daily Station Report. If the entire order is rejected, you will: (A) Write Rejections to Salvage on the face of the shop order; (B) Transfer all the parts and the production order to the Salvage Department; (C) Mark on your Station Tally Sheet that the entire order was rejected and sent to Salvage. Cross off the order number as being completed; (D) Report the action taken to the Records Department on your Daily Station Report.

Should the parts that were rejected be travelling on a Rework Tag or a Split thereof, the procedure will be identical except that the Rework Tag or Split will be used throughout the transaction.

A manufacturing company that establishes controls of this type on its production will soon find that many bottlenecks are eliminated. The movement of the manufactured parts through the plant will be speeded up and the cost of production will be lowered. Small companies may require only two or three control clerks for the entire manufacturing division. The cost of maintaining these men on the payroll is extremely low compared with the savings which naturally come with the controlled production.

It is not necessary to have a product that is manufactured on a production basis to use production control. Many job shops have found it worthwhile to use production control to cut costs.

STATION TALLY SHEET

DEPT. NO. 10 DATE Feb 17 1945

1. PRODUCTION ORDER NO.	2. PART NO.	3. PCS. ON ORDER	4. DATE RECD. AT STATION	5. DATE ORDER OR SPLIT COMPLETED
H63-01-1	2933	150	2/1/45	Split A - 50 To Dept 4 2/17
~~Split B~~ ~~501-06-2~~	2801	150	2/1/45	To Dept 4 2/17
H61-06-1	2847	100	"	To Stores 2/17
~~RW 6271~~ H95-02-1	2900-1	25	2/2/45	To Stores 2/16
RW 1005 506-41-2	2726	50	2/3/45	Split A 25 To Stores 2/17
~~H05-20-3~~	2820	100	"	50 To Stores 2/16 50 To Salvage on Split A 2/16
H07-H0-1	2700	100	"	Split A 50 To Dept 4 2/17 25 To Salvage on Split AA 2/17
H70-60-2	2807	100	2/4/45	
Split C 501-06-2	2801	27	"	

Permanent record maintained by the control station clerk.

Assembling lockers. The fasteners not only join the backs and sides of the lockers, but also the interior shelves. They likewise hold adjacent lockers together.

Faster Assembly of Knocked-Down Products

These factory lockers shipped knocked down, were assembled on the job in 1/2 to 1/3 the time formerly required

METHODS that can save time are important and welcome in any industry. And in no phase is that fact more true than in the assembly of products that are shipped knocked down.

Such a labor-saving process is exemplified in the case of lockers which are usually shipped knocked down and must be assembled completely on the job. In this specific application snap fasteners are used to fasten the sides to the back, to install the shelves, to secure the top and bottom, and to hold adjacent lockers to each other.

These fastenings jobs are completed in from one-third to one-half the time required by former methods. Holes are punched at the factory and the fasteners pressed into place at time of installation.

Although designed for permanent installations, the fasteners can be removed with a simple wrench or a pair of pliers. They can be re-used as often as desired.

In this particular installation the Lyon Metal Products, Incorporated, maker of the lockers, uses Shakeproof fasteners.

SURVEY OF THE MONTH

What Changes Should Congress Make in LABOR LEGISLATION?

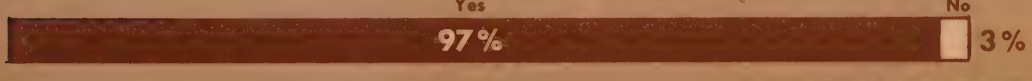
This MILL & FACTORY survey, made among all types and sizes of manufacturing companies, asks business leaders to give their opinions on some of the major changes in labor legislation which may be considered by the new Congress.

THE SURVEY SHOWS:

1. That 55.62% of the respondents feel the Wagner Act should be modified.
2. Almost 100% of the respondents advocate banning the closed shop.
3. Unions should be subject to anti-trust laws, 96% of the respondents state.
4. Unions should be made to publish audited statements of their finances, almost all of the respondents believe.
5. Mass picketing should be outlawed, 97% of the respondents state.
6. Strikes in public utilities and industries vital to public welfare should be outlawed, 97% of the respondents believe.
7. All respondents advocate outlawing jurisdictional strikes and secondary boycotts.
8. All strikes should *not* be outlawed, 78% of the respondents say.
9. Only 35% of the respondents believe in compulsory arbitration of disputes.
10. The Case Bill should not be passed as it now stands, 60% of the respondents say.
11. Strikers against government operation should not be subject to conscription in the armed services, 66% of the respondents state.

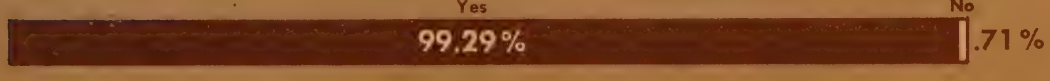
1. What do you think should be done about the Wagner Act?

2. Do you believe that the closed shop should be banned?

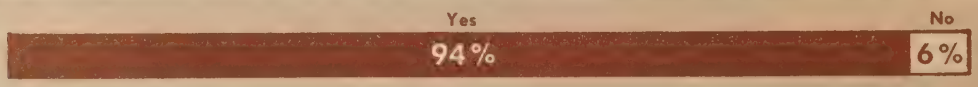


3. Should unions be subject to anti-trust laws, thereby eliminating industry-wide bargaining?

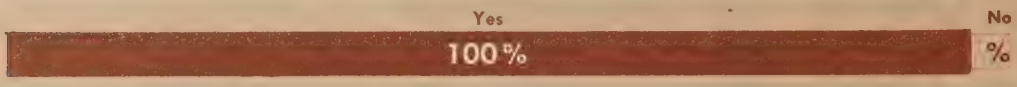
4. Should unions be made financially responsible and be made to published audited statements of their finances?



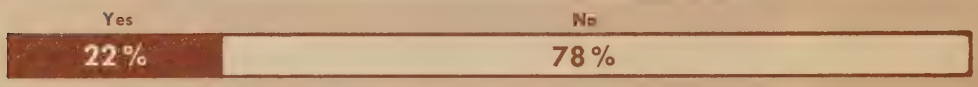
6. Should strikes in public utilities and in industries vital to the public welfare be outlawed?



7. Should jurisdictional strikes and secondary boycotts be outlawed?

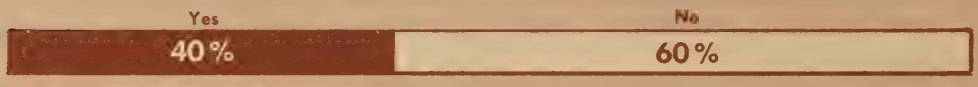


8. Should all strikes be outlawed?

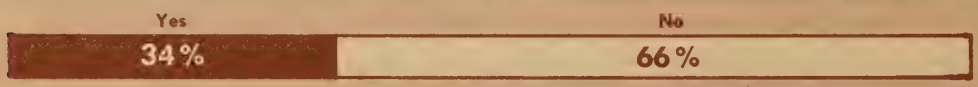


9. Do you believe in compulsory arbitration of labor-management disputes?

10. Do you believe that the Case Bill should be passed as it now stands?



11. Do you agree with President Truman that strikers against government operation should be immediately subject to conscription in the armed services?



Comments from Respondents

"Keep the Federal conciliators out of a dispute as long as possible. Their history has been to prolong strikes by following patterns that are time wasters."

New England manufacturing company.

"Make them incorporate becoming morally, legally and corporately responsible, the same as all other business organizations, thereby subjecting annual receipts of approximately over one-half billion dollars to taxation in all respects, the same as all other corporations."

Eastern manufacturing company.

"Create labor responsibility to the general welfare. Outlaw industry-wide bargaining and stagger contract termination dates." **Mid-western small parts manufacturer.**

"Modification of Wagner Bill to 44 or 48-hr week, overtime to be paid after 44 or 48 hrs. This would increase take-home pay and also production 10 to 20%."

New England manufacturing company.

"Our labor unions are handled by czars and these men perpetuate themselves in office. They serve themselves instead of the working men. The men in the unions should be able to elect their leaders from their own ranks. Our laws should compel unions to have charters, by-laws, etc., insuring free elections . . ."

Mid-western lumber manufacturing company.

"Make unions as well as individual members responsible for damages to property and personal injury to prevent violence." **Eastern manufacturing company.**

"Strike votes should be in secret under government supervision and a majority of all employes affected must vote to strike before a strike can legally be called . . ."

Middle Eastern manufacturing company.

"Collecting bargaining strictly on *plant* level. Closed shop with no initiation fee and with management's absolute freedom to hire and fire without question . . . might produce a healthy condition."

Middle Eastern manufacturing company.

"Profit sharing and incentive pay should be encouraged to increase production." **Eastern equipment manufacturer.**

"It is vital that no punitive labor legislation be passed, but laws regulating unions and union leaders as distinguished from labor itself should be carefully worked out."

Middle Eastern manufacturing company.

". . . Union elections not less than every two years—secret ballot supervised and counted by official tellers of NLRB . . ." **Mid-western manufacturing company.**

A. N. Wecksler,
Washington Editor

CIO has stirred together a hasty economic pudding as the basis for new wage demands by its member unions. The CIO position is ***based on the 1946 fourth quarter profits.*** At this rate of profit, it is concluded that manufacturing industry can pay a 21% increase in wages without any increase in prices.

Further, it is maintained, that only through such a substantial increase can a recession be avoided.

The study on which the ***CIO position is based*** was made by Robert R. Nathan, who operates an economic research organization. Nathan was formerly a Government economist and was in the forefront of those who predicted that ***unemployment would soar up to and beyond 8 million*** after V-J day.

The Nathan study was presented by the CIO as an independent research effort, which was being laid down before the bar of public opinion.

Automobile Manufacturers Association immediately countered the CIO study with a flat statement that ***another wage cycle would mean price boosts*** that would cut heavily into their market — that unemployment would be an ***inevitable result.***

Major loopholes in the Nathan study are:

1. A general statement on industry profits based on fourth quarter earnings is a highly specious assumption.

2. Claims that a large increase in wages can be sustained without an increase in prices during a short time cycle historically have been ***proved false.*** While some absorption may be possible in selected plants, if these manufacturers were sealed off against price increase of materials and components, this again is a test tube condition that ***cannot be reproduced in industry.***

3. Any percentage increase of wages across the board would give the high wage workers a considerable boost in wages, but dollar-wise would reflect in low wage pay envelopes to a small degree, and ***subsequent price boosts would wipe out the small wage earner's gains.*** Inflationary economists have always presented this argument in reverse showing that low wage workers are in greatest need of increases, but the practical effects of an across-the-board percentage increase ***works against*** the interests of this group.

4. Argument that wage increases can bolster purchasing power ***is contrary*** to Department of Commerce reports that what is in prospect is an adjustment in the manufacturing of soft goods because the current rate of manufacture is in ***excess of demand.*** Output of cotton goods, cloth, shoes, and similar items has filled the wartime backlog, and the adjustment looked for is merely to bring the manufacturing rate of these goods to a ***normal replacement rate.*** An increase in purchasing power through increase of wages would not sufficiently increase demand for these lines to maintain peak output — and would merely ***pile up further demand*** for such short goods as automobiles and houses to create ***further inflationary pressure.***

5. The report presupposes that our wage-price cycle is purely a domestic problem, and that regardless of the levels we boost our structure to that we can ***exploit foreign markets.*** This is obviously untrue, except for possibly a short range period, and even then ***would breed foreign resentment toward our goods*** when the market again becomes competitive.

The general reaction to the CIO (Nathan) report is that it is largely pabulum ***to lend justification for the wage demands*** which will follow and that these wage demands will be much more moderate and conciliatory than the general tone of the report.

Labor approach will be more cautious in the months ahead. The shadow of a new Congress primed with a labor program that will shear unions of the power to call crippling strikes will be a ***leveling influence.***

This in itself is not a guarantee against strikes in basic industries — but labor leaders are ***mortally afraid of legislation that will break their monopoly hold*** on large union memberships.

Lineup in the new Congress is highly significant. Senator Wayne Morse is the Republican exponent of labor liberalism — and Senator Joseph H. Ball of Minnesota is considered the Republican extremist.

The moderate in the Republican picture is Senator Robert A. Taft of Ohio. If strikes mar the economic picture, extremists will be able to push a ***grim program for labor*** through the new Congress. On the other hand, if labor shows a ***disposition to deal with management,*** and shun Government interference through peaceful settlements — Senator Taft's hand will be strengthened.

The ***National Labor Relation Board*** personnel has already begun to recognize these highly significant facts. They consider Taft their big hope for survival as an important operating agency.

Changes will be made in the National Labor Relations Act regardless of labor's behavior. The question is whether there is to be modification and adjustment of the Act or basic change.

Republican moderates center their program around the provisions of the Case Bill — which passed Congress and was vetoed by President Truman.

This important piece of legislation had many sound elements, but was unfortunately loaded down with ***extraneous issues*** that should have been handled through adjustments in the NLRA, and through other media. Sound strategy on the part of leading Republicans calls for ***divorcement of certain features of the Case Bill,*** which can better be handled through adjustment of the National Labor Relations Act.

With these features out of the bill, the theme of the legislation will be to provide a ***60-day period before a labor contract runs out*** during which differences would be ironed out, and during this period the Government conciliation services would be extended to aid in arriving at a settlement.

This would mean that all the controversial issues would be laid out in the open 60 days before a contract ended, and that this would give an adequate ***breathing spell for conciliators***. The fact that the negotiations were carried on while the old contract remained in effect would mean that there was no issue of involuntary servitude on the part of labor—that the feature which ruled out strikes during the 60 day period was purely and simply a ***contractual relationship***.

Again, the Republican strategy is ***not for punitive action***. The Republican position was that the coal strike and other current labor problems were traceable to unsound policy of the present administration. In this way, they plan to court dissident labor votes for the 1948 election.

Department of Labor officials take an optimistic viewpoint concerning productivity improvement during 1947.

View expressed by Ewan Clague, Commissioner of the Bureau of Labor Statistics, is that output per man-hour in most induststries today is at or above prewar levels. He points out that there are exceptions, but that there is ***nothing that should lead to pessimism***.

Clague goes on to say that in industries which had no reconversion problems:

> "output per man-hour in the third quarter of this year was averaging between 4 and 5% above the levels of a year ago."

At the same time, other BLS officials claim that the ***outlook for continued improvement*** in productivity is very bright. One key official states that there is a possibility that the overall increase will reach between ***7 to 10% during 1947***.

BLS officials maintain that too much has been made over the factor of lower worker effort. Clague's position on this score was expressed by him as follows:

"The facts on this subject are very meager. There are ***no definite figures or studies*** on worker efficiency or worker effort. It is very nearly impossible to find situations where one can measure worker efficiency per se. Even where both production methods and the products made remain identical over a period of time, changes which occur in output per man-hour ***cannot necessarily be attributed to the worker element alone***, since there is no assurance that management efficiency has remained unchanged. We do have ***management opinion*** on this question of worker effort and this is, of course, worthy of respect. It would be more conclusive if it were more nearly unanimous. And it is always difficult to avoid the suspicion that a bit of golden haze always obscures our ***remembrance of the past***. We already speak of the 'good old days before the war.' The numbing uncertainty of the early thirties seems already forgotten."

While the BLS position conflicts with the findings of several industrial and publication surveys, it is important as labor organizations have been ***basing their wage positions*** on Department of Labor analyses.

Not to be overlooked in the scrapping of controls by Government is the development which touched off the dissolution of the stringent control over housing materials.

In deciding against the ***program of Government support*** of a vast program for "industrialized houses", the White House was apprised that no more houses were completed with controls than would have been built ***if there had been a free market***.

In other words, the control program was a ***complete failure***.

At the same time, some very significant discussions are taking place on housing. Idea is for the Government to encourage some of the basic building materials manufacturers to launch a ***huge building program*** which would hit a peak sometime toward 1949 and 1950 ***to ward off any sag*** that may develop in the economy at that time.

Quit rate of veterans in industry is the ***highest on record***, according to a report by the U. S. Department of Labor.

The ***Veterans Administration*** is greatly concerned over trends in veteran employment, especially in the event of an over-all drop in national employment.

Facts are that the quit rate for veterans has been running consistently ***higher than that for non-veterans***. Latest figure shows veteran quits running at 72 per thousand for one month period. The rate for non-veterans was 48 per thousand during the corresponding period.

Over two and three quarter million veterans are employed in manufacturing industries, and the Veterans Administration is fearful that, with veteran quits running high during the current period of full employment, any softening in the labor market ***will accelerate turnover among veterans***.

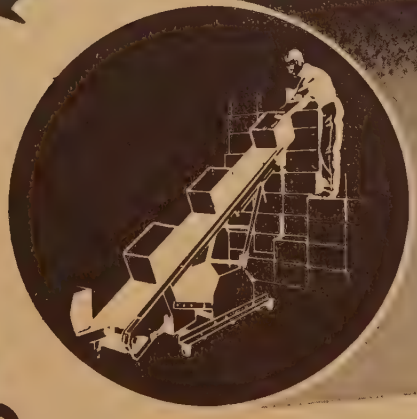
Danger in this trend is that instead of veterans blending into the labor force, there will develop ***special pressure groups*** as claimants in the veteran's interest.

MILL·FACTORY

"Industry's Know — How Magazine of Management, Maintenance and Production"

205 East 42nd Street New York 17, N. Y.

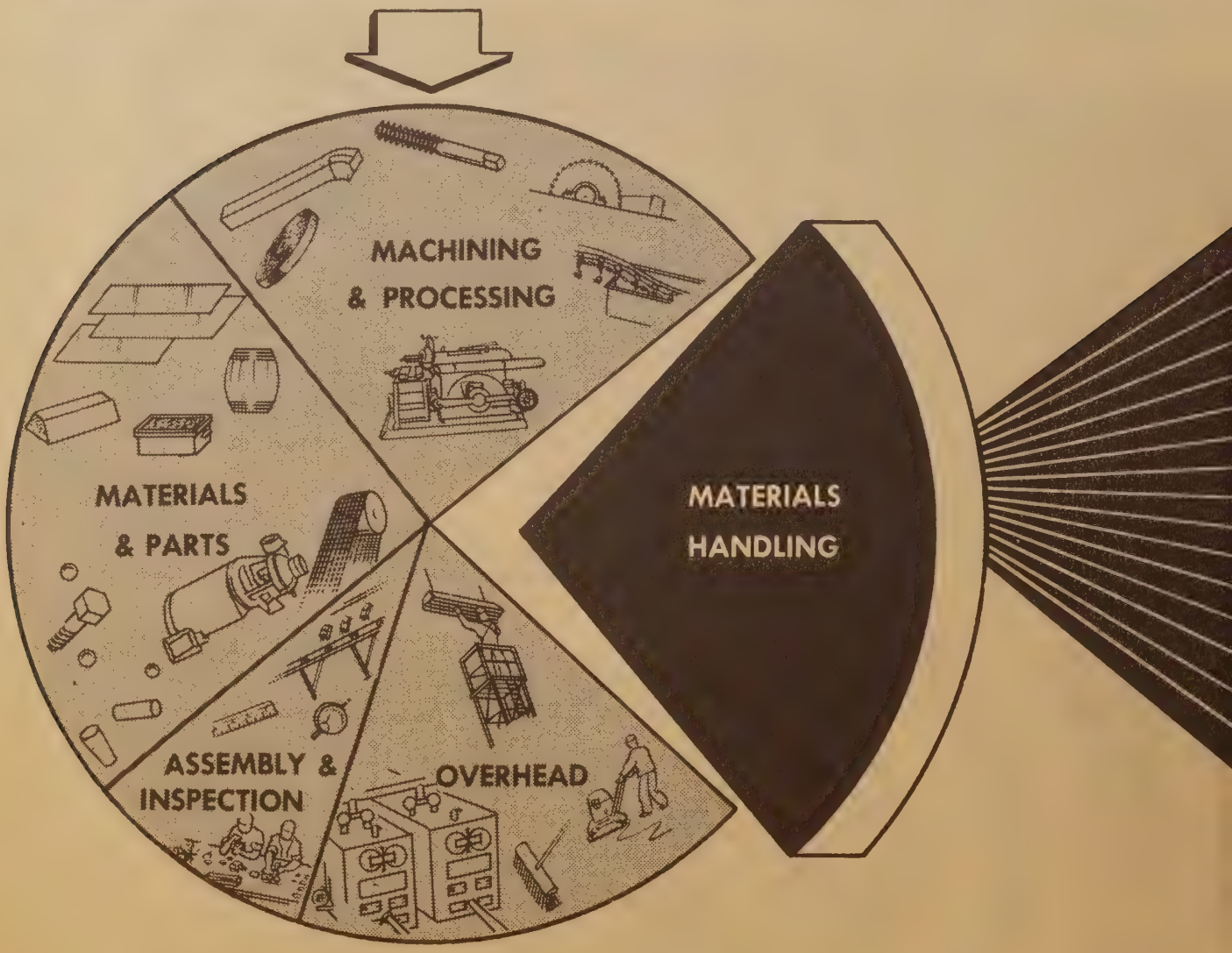
MODERN MATERIALS HANDLING EQUIPMENT



SAVES TIME AND MONEY

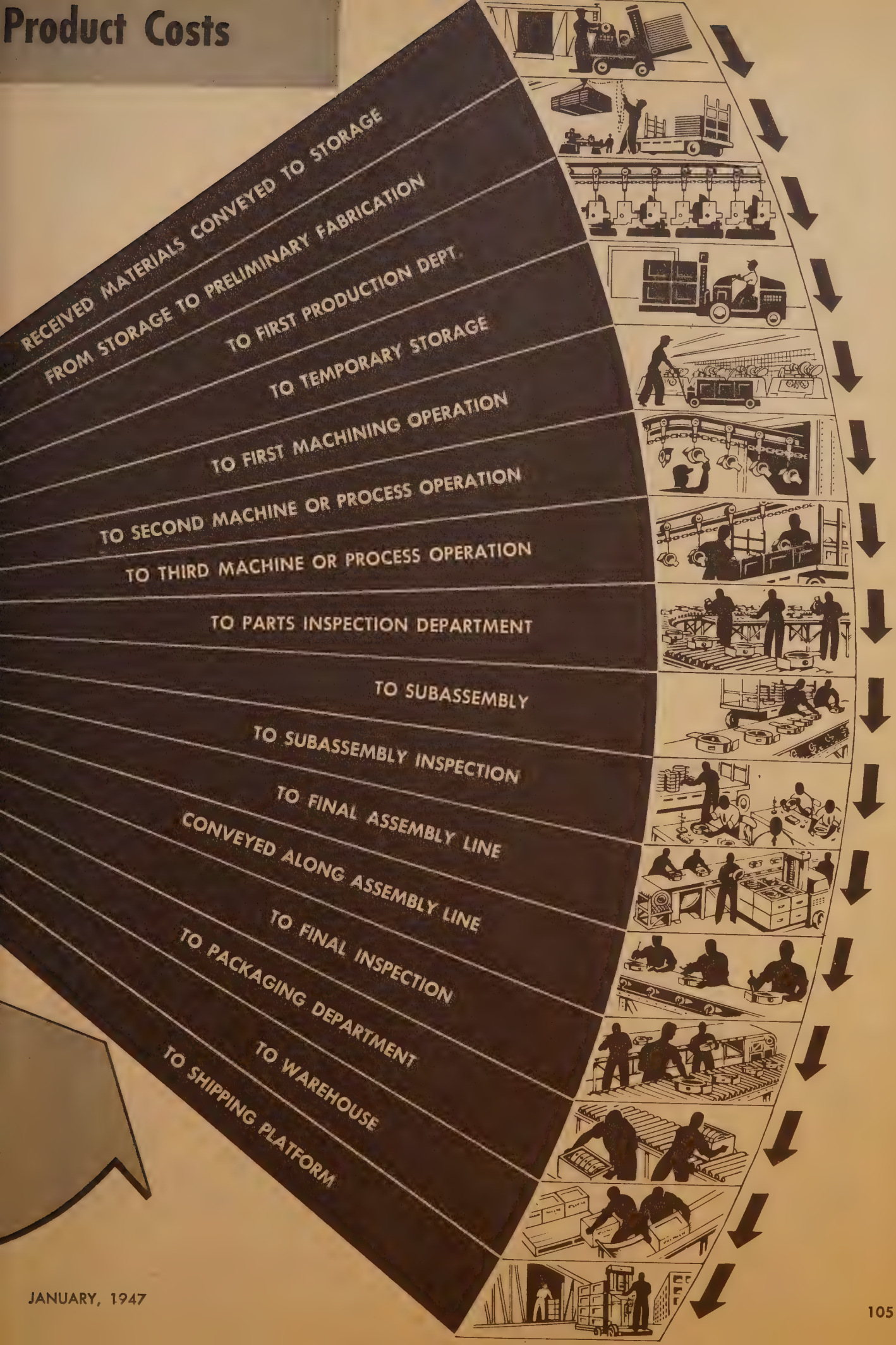
Materials Handling Costs Are An Important Part Of

Breakdown Of A Typical Product Cost



Typical Materials Handling Costs That Enter Into the Final Cost of a Manufactured Product

Product Costs



Modern Materials Handling Equipment Is More Economical

The handling of materials is a major industrial problem that is common to all manufacturing concerns—whether they make pins or locomotives. Moreover, whether they make *low cost* or *high cost* pins or locomotives, depends very largely on just how efficiently they handle their materials.

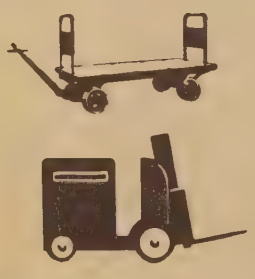
Present high labor and material costs give material handling methods an added importance as a means of reducing manufacturing costs. In the average plant little can be done to reduce labor rates and material prices, but a great deal can be done to reduce the cost of handling materials.

Material handling costs generally account for 20% or more of the final cost of a product. This can vary greatly, even in the manufacture of the same kind of product. It is, therefore, of utmost importance to a manufacturer to make full use of the most modern materials handling equipment and techniques, in order to keep handling costs at a minimum and to meet the selling price of his competition.

During the war, the dearth of labor and the need for fast production led to the development of greatly improved materials handling equipment and techniques, most of which are readily adaptable to civilian production. These new developments offer great possibilities for reducing manufacturing costs. Modern equipment is faster, more efficient, easier to maintain and offers many other advantages. This special editorial section shows a few of the things that are being done with modern materials handling equipment and techniques.

A FEW HIGHLIGHTS IN THE DESIGN OF MODERN MATERIALS HANDLING EQUIPMENT

SHOP TRUCKS



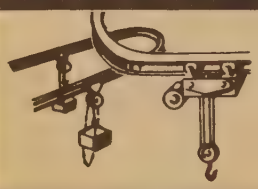
Power

- Small turning radius
- Small, light weight and high capacity design
- Ease of Operation
- Simplified battery handling and charging
- More rugged and longer lasting batteries
- Very high lift fork types
- More rugged and non-static tires
- Power-driven hand trucks
- Economy of operation
- Constructed of stronger materials

Hand

- Light weight aluminum and magnesium construction
- Stronger steel alloys
- Fully equipped with anti-friction bearings
- Single frame construction, eliminating lower frame and giving increased grade clearance
- Handle and wheel guards
- Single stroke lift
- Lifting possible with handle at any horizontal angle
- Automatic engagement of lifting mechanism
- Safeguards against flying handle
- All-welded construction
- Numerous special purpose designs

OVERHEAD CRANES AND CARRIER SYSTEMS

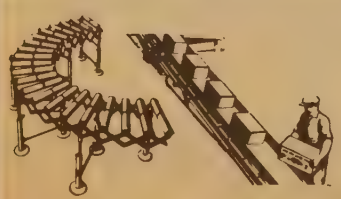


- Light weight, long span and high capacity designs
- Use of transfer tracks, cross-overs, interlocks, etc.
- Faster lifting and traveling speeds
- Stronger and more reliable construction
- Better means of rail traction
- Ease of operation
- Remote control operation
- Automatic operation of predetermined cycles
- All-welded bridge assemblies
- Air-conditioned cabs

HOISTS AND CHAIN BLOCKS

- Light weight and more rugged construction
- Lower head room
- Reduced maintenance requirement
- Fully equipped with anti-friction bearings
- Easy, safe, smooth and quiet operation
- Brakes of advanced design
- Sealed operating parts
- High efficiency of operation

CONVEYORS



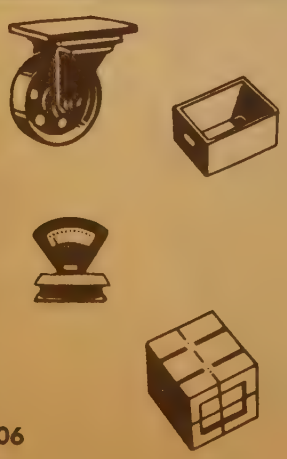
Conveyor Belts

- Ease of assembly and installation
- Standardization of frames and sections
- More effective belt cleaners
- Precision bearing rollers and carriers
- Better belt cover compounds to minimize abrasion and corrosive action
- Easier means of repairing
- Better troughing qualities

Roller and Wheel Conveyors

- Adaptable to a wide variety of applications
- Light weight sections for easy portability
- One piece frames
- Reversible curve sections
- Oil impregnated, self-lubricating bearings
- Self-aligning, dust- and moisture-proof bearing housings
- Easily adjusted standards and tripods

MISCELLANEOUS



Casters and Wheels

- Precision anti-friction bearings
- Dirt seals to protect bearings
- Wheels and casters of plastics and other new materials
- One-piece aluminum alloy castings
- V-Groove casters for use on angle irons and other tracks
- Dual wheels and casters for exceptionally heavy loads
- Pneumatic tired wheels
- Static and oil-resistant materials
- Spring suspension mounting to reduce shock
- Improved fastening devices

Boxes, Bins and Baskets

- New light weight and corrosive-resistant materials
- Numerous designs for special purposes
- Special portable racks for suspending or holding boxes
- Designs for easy racking and handling by truck
- Better designs for stacking

Grabs, Grips and Tongs

- Use of toggle arms
- Numerous designs for special purposes
- Power operated tongs and grabs
- Large capacity units

Scales

- Better design for long life and accuracy
- Quick acting and easy reading
- Automatic weight recording
- Automatic rejection of wrong weights

SHOP TRUCKS
DEPT
8
CAUT

POWER TRUCKS

During the war there was a tremendous increase in the use of shop trucks of all kinds. Not only did the Army and Navy make efficient use of shop trucks, but many manufacturers who had previously not used them, or had used them to only a limited degree, learned about the saving that these efficient handlers of material could make in reducing handling time and lowering handling costs. The result is that today nearly every manufacturing plant of any size uses shop trucks of one kind or another.

During the war, when materials were scarce, shop power trucks were standardized to so few designs which fitted in with the widest applications in industry. Following the war, truck manufacturers have again broadened their field of truck designs, so that there are now available a variety of designs which may permit the much more efficient handling of certain types of products than is possible with the standardized type of truck. It, therefore, behooves the manufacturer to check his existing equipment, particularly if it was purchased during the war, and learn whether or not some of the new truck designs can handle his materials handling problems more efficiently. Some of the styles now available include high lift fork trucks—up to 18 feet, tilting platform trucks for dumping loads, roller conveyor tilting platforms, power winch designs for pulling on and transporting large unit loads, trucks with lifting attachments for handling all types of odd-shaped loads, scoop shovel trucks for handling bulk commodities, small, compact trucks which can maneuver in unbelievably small areas, and many other designs to fit special requirements.

A truck style that received unusual impetus during the war is the fork truck used in combination with pallets. This type of truck was used very extensively by the Army and Navy as well as by industry. The Navy in particular made a very elaborate study on the use of palletizing and handled by means of pallets everything from food cartons to aerial bombs. Many industries have found that the use of pallets has greatly reduced their receiving, shipping, and inside plants handling costs.

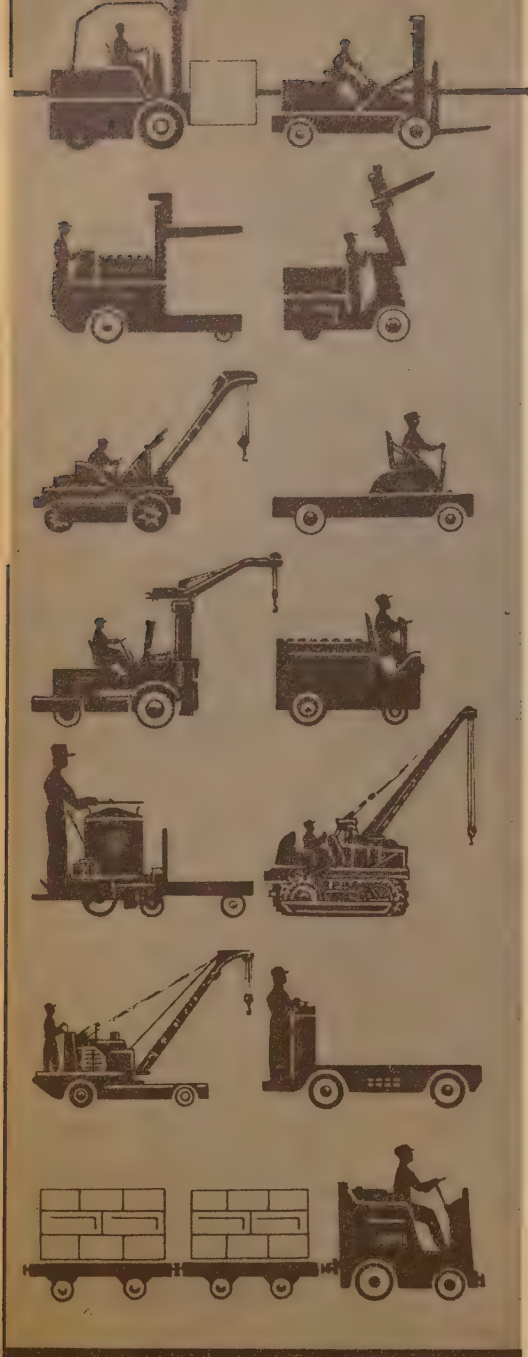
Another truck design that was greatly improved and expanded during and immediately after the war, is the powerized hand truck. These trucks are now available with power lifts as well as power travel and are ideally suited for handling light loads and getting in very tight areas. Shop trucks today are made unusually rugged and designed to give reliable, long-lasting service. All parts are made of the best materials to serve their particular purposes. Special alloy steels, which frequently were unobtainable during the war, are again being used to good advantage. Anti-friction bearings are used wherever possible and the motive power whether it be electrical or gas, is designed for efficient operation and reliable service.

Modern shop trucks are designed to facilitate maintenance service. All control parts and operating mechanisms are easily accessible. Parts subject to wear can be easily replaced and the lubrication of bearings has been greatly simplified.

Although 30-ton lift platform trucks and 15-ton fork lift trucks were in use before the war, trucks of greater capacity are now in the process of being designed. One company is drawing up plans for a 30-ton capacity fork lift truck for very heavy duty in steel mills. Other style trucks for special heavy duty work are also in various processes of design.

At the other end of the scale are very light and compact truck and tractor units of many different styles. These are easy on buildings flooring and can be operated on floors capable of standing only very light travelling loads. Floor loading capacity is becoming a very important problem in many plants due to the high tiering of static loads made possible by high lift trucks. This problem is greatly aggravated by the use of heavy duty trucks carrying heavy loads. In many cases, the efficient utilization of light capacity floor areas, can only be solved by the use of light weight, light capacity shop trucks.

Compared with many old pre-war models, the modern power truck is quiet in operation, smooth operating, and easy on the floor surfaces. Tires with dual and high traction threads can greatly reduce the wear on floors. In addition, many modern shop trucks are equipped with pneumatic tires.



A FEW HIGHLIGHTS ON MODERN POWER TRUCK DESIGN

TRUCKS —

More comfort for the operator.
Better visibility for the operator.
Stronger frames and bodies.
Improved maneuverability.
Speeds of 10 mph and higher.
Full load lifting speeds up to 40 ft. per minute.

CONTROLS —

Smoother acceleration and deceleration.
Ease of access to controls for servicing.
Protection against forced acceleration.
More effective braking safeguards.
Ease of operation.
Ease of access to batteries and motors, or gas engines.

TIRES —

High traction treads.
Grooved treads for heavy loads.
Dual treads on solid tires to absorb shocks.
Special tires to reduce static.
Pneumatic tires that are easy to mount.
Safety vented pneumatic tires to avoid sidewall blisters.

HAND TRUCKS

TYPICAL SPECIAL HAND TRUCK STYLES

Type for HANDLING BARRELS OR DRUMS.

SINGLE HANDLE STYLE for cases and kegs.

CABLE REEL TRUCKS.

PRY POLES.

SKID SPOTTERS — LIFT JACKS.

CARBOY and TOTE BOX TRUCKS

PORTABLE ELEVATING TABLES.

LIFTERS — PORTABLE ELEVATORS

OPEN TOP BARREL TRUCKS.

CLAMP TRUCKS

WELDERS' TANK TRUCKS.

BARREL CRADLES.

PLATFORM TRUCKS with many body styles.

OXYGEN TANK TRUCKS.

SCALE TRUCKS.

A FEW HIGHLIGHTS FOUND IN MANY MODERN HAND TRUCKS

LIGHT WEIGHT and stronger construction.

EASIER TO MOVE, better balanced and with handle and wheel guards.

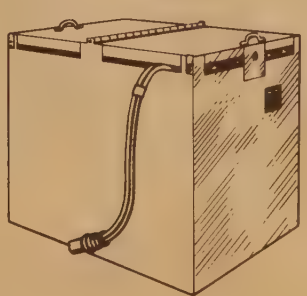
ALL-WELDED construction. Light metal construction.

SINGLE STROKE LIFT, and lifting possible with handle at any horizontal angle.

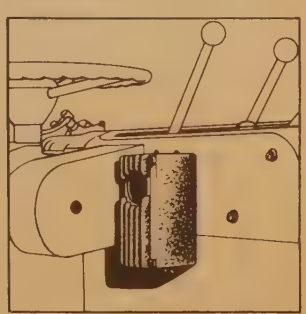
EASIER OPERATING hydraulic and mechanical lifting mechanisms.

This is but a sample of the numerous types and styles of hand trucks available to industry.

BATTERIES FOR SHOP TRUCKS

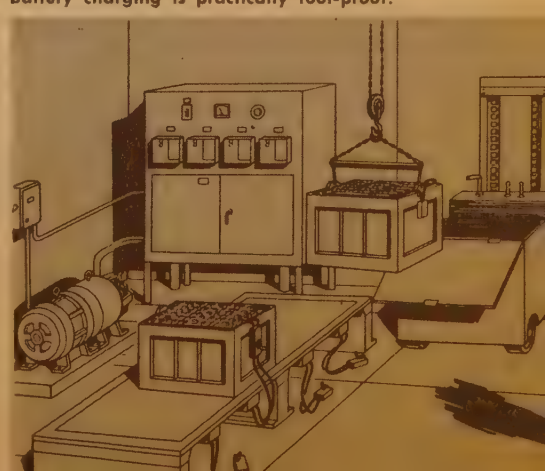


Steel tray with cover.



Discharge indicator on truck.

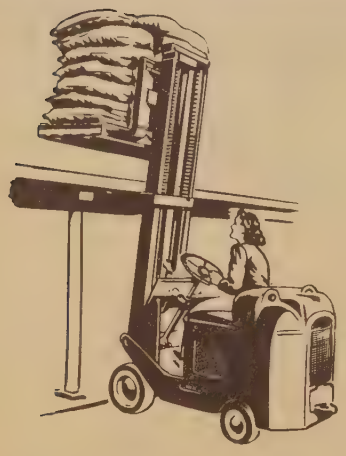
Battery charging is practically fool-proof.



Modern storage batteries for shop trucks offer many improvements over those used a few years ago. They are designed to withstand rough use, easy handling and simplified maintenance. Larger capacity units are available in smaller physical sizes, and sustained high voltage characteristics have been improved. Corner-welded steel, or heavier reinforced wood trays are now used. Mats, plates and separators are better constructed and grids are designed to withstand rough usage.

Battery charging systems are now practically fool-proof, with reliable safeguards against over-charging, charging at too fast a rate and back-feeding. Discharge indicators for direct mounting on the shop truck, can now be used to warn the operator when the battery in use is approaching a discharge condition.

HOW COMPANIES HAVE REDUCED MATERIALS HANDLING COSTS WITH INDUSTRIAL TRUCKS



$1000 Monthly Saved in Labor Costs

When the Cambridge Tile Co. Cincinnati, Ohio, devised a successful method of compressing and processing food products in order to conserve shipping space, it found that ordinary manual handling could not keep pace with new and improved methods of production.

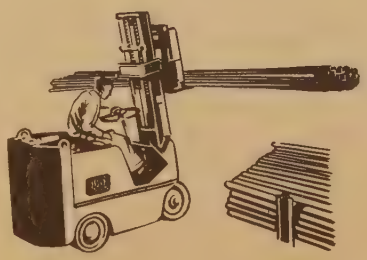
To take full advantage of benefits of the improved processing method, the materials handling system had to be able to unload raw materials from railway freight cars, carry full pallet loads to storage, and stack loads three high in order to utilize storage space. It had to service receiving, production, storage and/or shipping departments when necessary and be capable of placing materials on 7-ft. high platforms. Moving finished products to storage or shipping to prevent production delays, and speeding up weighing of finished products destined for the shipping dock were other functions demanded.

A single lift truck was installed and found capable of performing all of these functions in addition to saving 61% man-hours. Including all depreciation, operating and maintenance charges, as well as expenses incurred in palletizing, the operation saved over $1000 a month in labor costs alone.

Handling Costs Reduced 30¢ per Ton

A mid-west manufacturer formerly used hand trucks for loading finished products on trucks and freight cars. These trucks were pulled by hand and frequently caused considerable congestion because of the large number required. Loading costs amounted to 45c per ton of finished product.

A skid system and a single power truck were substituted for the old method. This not only reduced the loading time, but released four men for other work. The single power truck now handles the entire loading job at a cost of 15c per ton, reducing the handling cost by 30c for each ton of finished product loaded.

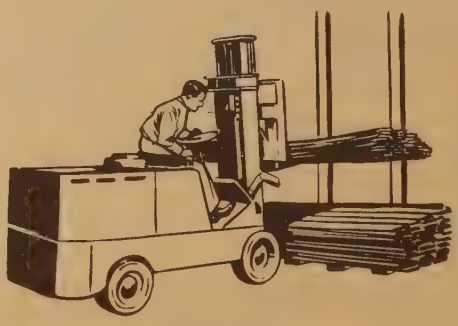


One Truck Does Work of 10 Men

In the receiving department of Warner Gear Division, Borg-Warner Corp., Muncie, Ind., one lift truck performs the work of a 10-man gang. Its operation costs ½ of the operator's wages. For 16 hours a day, the truck clears the receiving department docks and handles almost any materials that come in. It can pull the load to the rear of the truck with a chain, lift it out, and carry it to any of 20 departments. Among other duties, the truck handles 18-ft. long bar steels, and helps move machinery in and out of the plant and between departments.

Scoop Truck Solves Problem

Removing salt cake from a full box car was a problem at Thilmany Pulp & Paper Co., Kaukauna, Wis. Four men worked 13 to 14 hours each to complete the job with manual methods. A lift truck, equipped with a scoop attachment, was installed to make it possible for one man to complete the same job in five hours, 15 minutes, less than 1/10 the time. The truck scoops up a load from inside the car, carries it 45 ft. (including 38 ft. up a 6-ft. high ramp) and dumps the load through a trap door—all in less than 50 seconds. In addition to time and labor savings, the truck has saved thousands of dollars in freight and demurrage costs.



Efficiency Ratio is 3¼ to 1

A ratio of efficiency between the lift truck and manual handling methods as figured on certain operations by the Cleveland Graphite Bronze Co., Cleveland, Ohio, is 3¼ to 1. This is figuring average cost for operation, depreciation, maintenance, etc.

On one job, raw material storage in the strip mill, 21 men were required to do a job manually which can be done by five men and two lift trucks. Another operation calls for the use of one truck and operator to do the work formerly accomplished by five men.

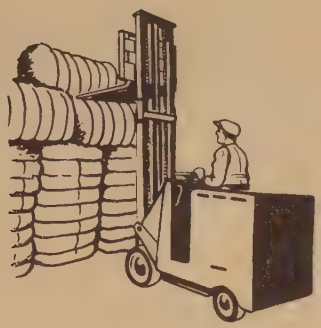
Three Kinds of Savings

Savings in space and labor as well as the saving of manpower for more productive work have been realized through use of lift trucks at Bigelow-Sanford Carpet Co., Inc., Thompsonville, Conn.

Storage space was increased by 30% through use of a truck capable of stacking bales 4 and 5 ft. high. In a warehouse having 100,000 square feet of storage area, this represents an increase of 30,000 sq. ft. Rental fee, including insurance, maintenance costs, etc., averaged $3.00 psf per year, so approximate savings were $90,000 annually.

One man, operating a truck with scoop bucket attachment, removes snow in eight minutes, a task which formerly required four men for a full hour. The truck lifts and dumps a load every 1¼", loading a 3-yard truck in 8". The other men can be employed in more productive work.

Waiting time of $5.00 an hour was formerly charged when trucks were kept from the unloading dock. By using a lift truck which costs $1.00 an hour to operate and is capable of unloading trucks from ground level, the waiting time is eliminated and considerable savings are effected during a year.



Many Savings Realized

The materials handling problem at the Edgar F. Hurff Co., Swedesboro, N. J., entails carrying and stacking an enormous quantity of cases of food products in plant and warehouse, between various production operations and storage; loading and unloading freight cars and trucks, and performing miscellaneous handling tasks about the plant. Pallet loads consist of 25 to 40 cases and average one ton in weight.

Five lift trucks were chosen. On one operation, where the truck makes a 250-ft. round trip every three minutes moving 200 pallet loads from labelling machines to warehouse stacks, the truck and one man accomplish the work of 2½ men each day. The cost of operation, including the truck and operator, is 1.7 of the average warehouseman's wage.

Another unit makes trips of 500 ft, handling 75 loads per day, a job formerly requiring five men and now requiring two. With the truck costing 1.7 laborer's wage and doing the work of four men, the wages of 2.3 men are saved.

Two trucks each do the work of a 16 man gang during a 13 hr day at the time of the tomato season. The trucks keep abreast of a flow of cases from eight conveyor lines which transport cans from sealing and labeling machines to the packing station. The trucks move the cases to the storage stacks without slowing down the conveyor lines. An estimated savings of $10 per hour on each truck is realized.

In loading a 14-ton trailer, one truck hauls 28 pallets on a 500-ft round trip in two minutes. The trailer is loaded by two men in one hour. An 8-man gang would be required to truck these 700 cases by hand, thus a net gain in labor costs alone is 4.3 laborer's wage.

Tiering Truck Pays

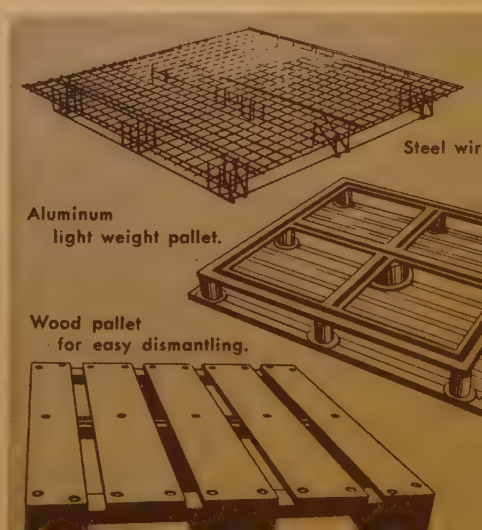
It is difficult to evaluate the savings in dollars and cents of the tiering truck shown in the illustration but, a large manufacturer of electrical equipment claims it pays heavy dividends in saving of floor space alone. This is not difficult to understand when it is considered that new building to obtain required floor areas is about impossible under present conditions.

Ordinarily and without the use of the tiering truck the large containers would require three times the area for storage as when stacked three high. Considering that each container is four feet square and 42" high containing approximately 3000 pounds of product not only are 40 square feet of floor space saved for the three or 13 sq. ft. per container but the area loading is also increased by three or from 187 lbs. per sq. ft. to 562 lbs. Taking building costs at present day high levels this is no small saving.

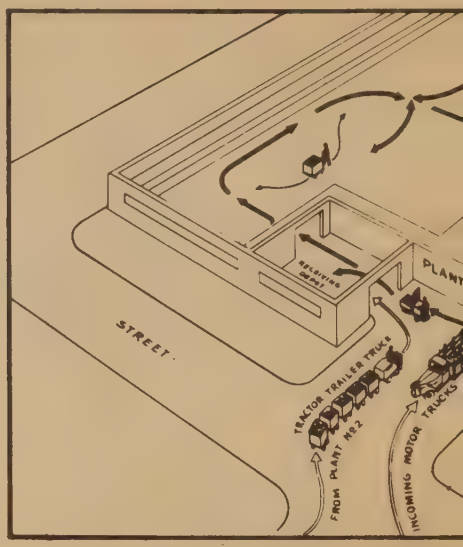
Many materials are capable of being handled by this method from scrap aluminum, brass turnings to the products of production in practically any stage of completion.

PALLETIZING

Properly applied, the use of pallets can often greatly simplify the handling of materials. They are not, however, a cure-all for all handling ills, and have occasionally been misapplied. Pallets are now more or less standardized at 48" x 40". Two 48" lengths fill the width of a box car and two 40" lengths comfortably fill the width of a standard size truck or trailer. Pallets are made of paper, wood, magnesium, aluminum and steel. A warehouse company now rents pallets and collects the unused pallets from the receiver of the goods, so that these pallets can again be distributed. This permits a company to ship goods by pallet without the attendant expense of pallets not being returned.



ROUTINE HANDLING BY SHOP TRUCKS



Barrels by Pallet

Handling 8 barrels at one time, by means of pallets and a fork lift truck. The lift truck permits high tiering, so that all the warehouse space can be utilized.

Truck Serves As Mobile Crane

A foreman in a welding shop designed a simple strap and angle iron jig, which can be easily slipped over the platform of a shop truck and which can be used as an improvised crane for handling light materials around the shop.

Small, Highly Maneuverable Truck

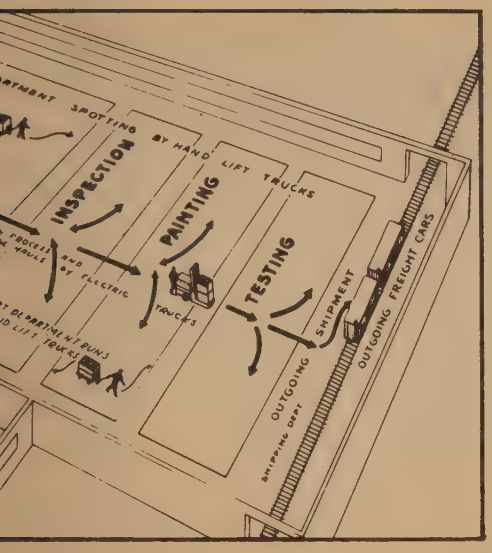
A small, light weight type of shop truck that can be easily maneuvered in small areas. Here it is moving a skid of cartons into a box car.

Departmental Storing

Using box skids in the routine storage of parts in a factory department. Several skids can be tiered and handled at one time.

Tiering Light Weight Pallets

Twenty-four cartons per pallet beng tiered in warehouse. Pallets used in this case are of light weight aluminum construction.

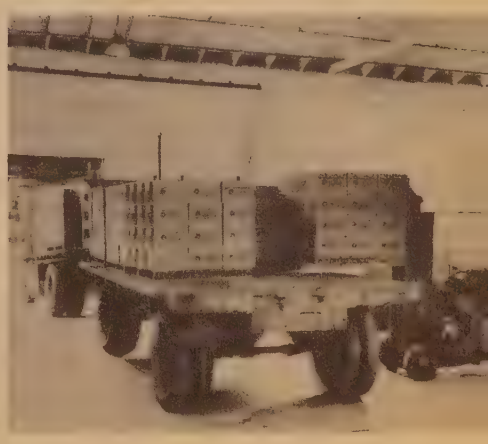


Handling Bags by Pallet

High lift fork truck handling two pallets of bags at one time. Twenty bags are loaded on each pallet.

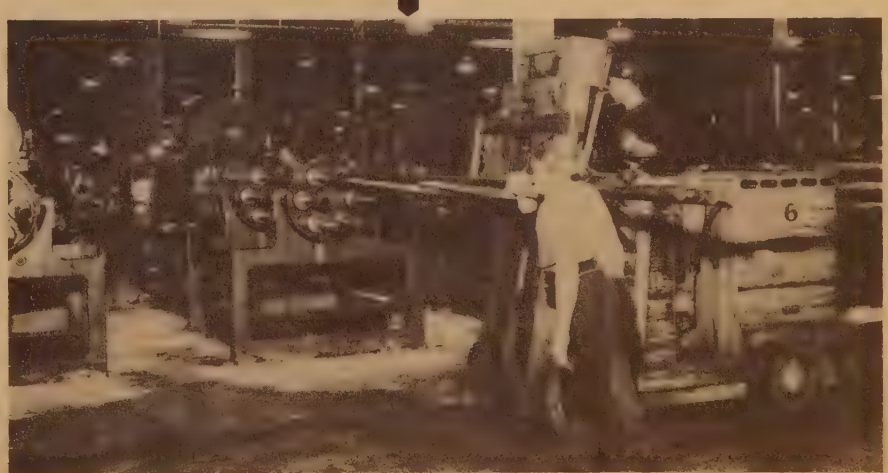
Loading Pallets on Trailer

Fork lift truck being used to load pallets of cartons on truck trailer body. Two pallets abreast neatly fill the width of the trailer.



Loading Automatic Screw Machine

Fork lift truck being used to load bar stock into an automatic screw machine. Truck brings bars directly from stock room and fork can be raised and lowered to correspond with the loading level of the machine.



Articulated Fork Truck

Fork truck equipped with an articulated fork to permit increased maneuverability in handling cartons of canned goods by means of pallets.

Six-Ton Trailer Train

One of 75 tractors used at Armour & Company to pull 6-ton trailer trains of materials in interchange between factory buildings.

UNUSUAL APPLICATIONS

CAMERA "SHOOTING" FROM TRUCK

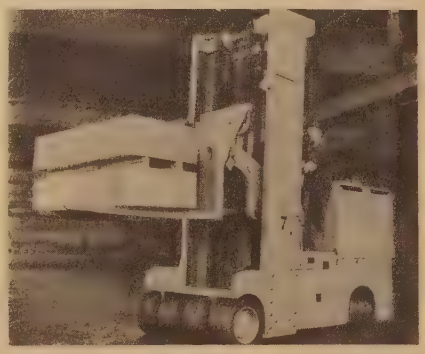
Even the photographer finds a handy use for the fork truck. He can set up tough camera angles on a secure footing without ladders or other rickety props. Wiring, plumbing, scaffolding and painting are among unlisted uses for this flexible machine.

Heavy ram truck used to handle large coils of strip steel.

Handling cumbersome products by means of platform trucks and skids.

SCOOP SHOVELS MOLDING SAND

A special scoop attached to the forks of a standard battery-powered fork truck serves as a shovel and permits the truck to deliver molding sand wherever needed in the plant. The truck does this job in its spare time. The abrasive dusts in plants such as this brass foundry have no effect on battery-powered trucks.



This fork truck has a 15-ton capacity and is used for handling sheet steel in a rolling mill. An interchangeable ram can be installed to handle sheet steel coils.

CONSUMABLE PALLETS

Pallets of zinc spelter are stored with an electric fork truck as they are received from the smelter where the pigs are cast in the form of interlocking slabs. The pallets can be melted down at the receiving end of shipment and need not be returned.

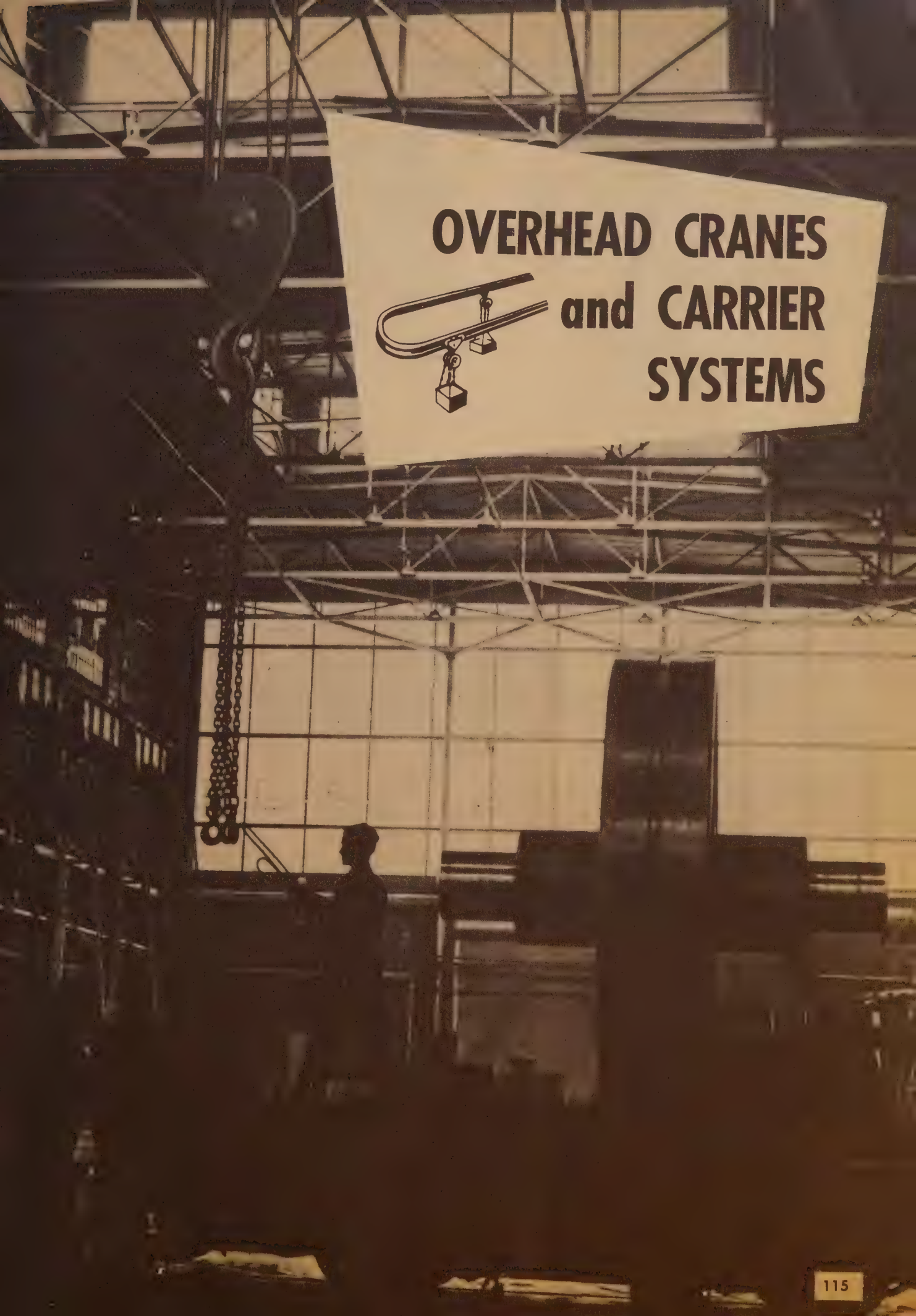
CHARGING HEAT-TREATING FURNACES

This method of charging heat-treating furnaces is becoming increasingly popular. Handling the heavy loads and positioning them in furnaces is the work of the battery-powered industrial truck. The speed with which the trucks perform the operation is significant since the oven door remains open only a matter of seconds and the furnace does not cool off.

HYDRAULIC PINCERS REPLACE FORKS

A specially modified version of the fork is a clamp truck which operates with hydraulic pincers in place of the regular forks and which is constructed so as to be adjustable to handle any size or type of cartons of light and bulky commodities.

The need for pallets in tiering, detiering and hauling operations is eliminated. Clamping pads, adjustable in height, are mounted on a scissors-like frame opened by a hydraulic pump. Release of the hydraulic pressure allows the springs to pull the clamps together, grasping the load between them.


OVERHEAD CRANES
and CARRIER
SYSTEMS

A FEW HIGHLIGHTS OF MODERN OVERHEAD CARRIER SYSTEMS

- Manual or motorized carriers
- Manual or motorized hoists
- Pendant or remote control
- Automatic cycle performance
- Ball and roller bearing carriers and bridge wheels
- Pneumatic tire traction units
- Gear traction mechanisms
- Quiet and fast operation
- Manual, electric and pneumatic track switches
- Track crossovers
- Circular track sections
- Transfer bridges
- Track extensions
- Two elevation transfer sections
- Double-roll current collectors
- Multiple hook hoists
- Overhead control cabs
- Cabs that can be raised and lowered

A FEW TYPES OF SPECIAL LOAD HANDLERS

- Long drop sections
- Hair-pin hook carriers
- Motor-driven roll grabs
- Multi-shelf trays
- Portable hopper buckets and double bucket carriers
- Motorized, rotating box grabs
- Motorized pipe grabs
- Pallet grabs
- Rack carriers
- Motorized crate grabs
- Bottom dump boxes, buckets and tanks

OVERHEAD CARRIER SYSTEMS

A FEW years ago when industrialists spoke of monorail handling systems, they generally referred to a hoist or chain block mounted overhead on an I-beam, so that it could be pulled a short distance in order to move the load it was lifting. Today's monorail systems, with elaborate track interlocks, bridge extensions and automatic operating cycles, are a far cry from those of a few years ago. The present use of the word monorail is rather a misnomer, as many so-called monorail systems use more than one rail. The name has come to mean any tramrail or overhead carrier system which is underslung or hung from rails or beams beneath the roof structure without support from the floor.

During the war years there was a great increase in the rise and application of overhead carrier systems. Perhaps the most spectacular developments were in the large aircraft plants, where overhead carrier systems ran the entire length of the huge buildings and, by means of interlocking bridges, twin bridges and multiple runways, they were used for handling large subassemblies over long spans. By the simple method of doubling up on several bridges and mounting 5-ton cab-operated carriers between them, carriers as long as 487 ft. have been built and operated as moveable railways.

Another important development which started shortly before the war, was the adaptation of overhead carrier systems to automatic operating cycles. These have now become very elaborate and are used advantageously in many industries. The more simple systems will pick up loads at predetermined periods, carry them to where they are needed, lower the loads and even dump them when so desired. More involved systems may have many intermediate steps, such as automatic weighing, and cleverly arranged interlocking features to prevent any accidents or wrong spotting of loads.

By means of track interlocks and switches, overhead carrier systems can change their movement to any desired travel angle, move into other bays, or change over to an entirely different set of tracks. Two carriers can be interlocked and operated from a single cab, in order to double the lifting capacity of a single unit.

Together with the improved overhead track system of these carriers, there has been an equally important development in the various load carrying mechanisms. In addition to the all-important hook and sling, there are numerous grabs, tongs, buckets and magnets for handling special load requirements, all types of racks, baskets and tubs, motorized roll grabs that can turn rolls of paper or metal end over end, and numerous other special devices. There are cabs which can be raised and lowered, so that a single operator can attach and detach the loads that are conveyed.

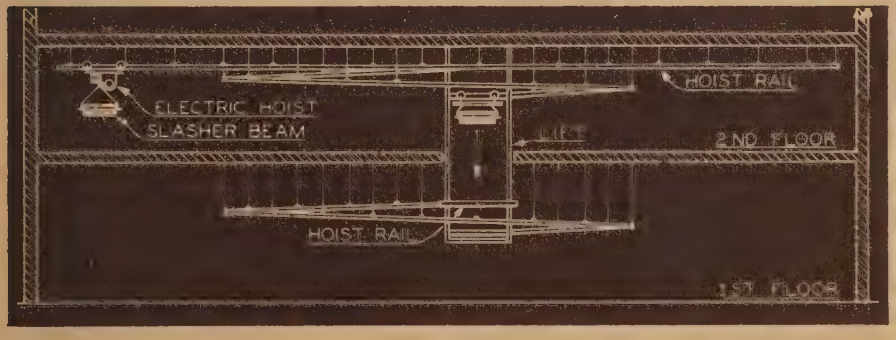
Modern overhead monorail systems are quick-moving, reliable and flexible. It is relatively easy to change over an existing system to meet new requirements. In general, monorail systems are light in weight and require no special building construction to support their loads.

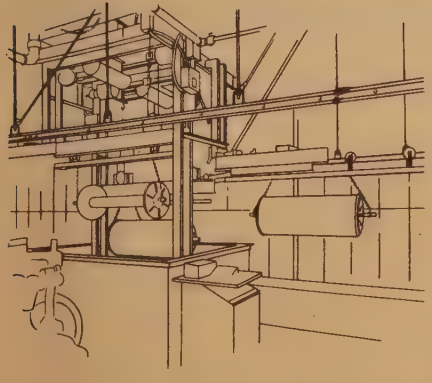
The above are but a few of the things that can be done with overhead carrier systems. On the following pages are a few of the carrier systems actually in operation, which will give some idea of the wide range of operations possible by this method of materials handling.

TYPICAL OVERHEAD CARRIER and CRANE OPERATIONS

Drop Sections as Production Machines

Drop sections are used in a plant as production machines for cleaning and plating of automobile bumpers and can be arranged as multiple units for progressive processing, or as single units for individual operations. Because the drop sections are motor-operated and push button controlled, the operator has accurate control of the load at all times.





Automatic Monorail System In Cotton Mill

As an example of the first type is a system installed in a cotton mill for the movement of 400 loom beams per two-shift day from a slasher room on the second floor to a tying-in room on the first floor. Equipment consists of a monorail loop on each floor extending from the discharge point of one lift to the loading point of the other. Carriers consist of frames on two 2-wheel trolleys with load chains and hooks to engage the warp gudgeons.

Operation of the "down" transfer is as follows: beams are doffed from the slashers by means of an electric hoist running on a straight monorail track serving all slashers. When a carrier is loaded, it is released to travel by gravity around the loop to the feed-on end of the "down" section where it immediately lowers or awaits the return of the lift section from the first floor. This section, in the upper position, interlocks with the monorail loop and thus allows carriers to roll directly on and in so doing, set a safety stop to prevent the next carrier from going forward. It also sets in motion the hoist mechanism. Carriers, when lowered to the first floor, roll automatically off the section when it is registered at the interlock to the gravity loop in tying-in room. In so doing, the carrier releases the lift which returns to the second floor loop. Operation of the "up" lift is exactly the reverse to the "down" so that the carriers when empty are automatically returned to the slasher room to receive another beam.

Transfer Bridges Answer Problem

Two 4-runway transfer bridges of 5-ton capacity each are used, one on each side of the columns, in the middle of a plant's draw bench and testing department. The bridges interlock with a short spur to enable a cab-operated carrier to travel from one to the other and provide complete materials handling coverage of the entire department.

Time-consuming rehandling that would be necessary with standard overhead cranes in transporting materials from one bay to the other is eliminated. The single cab-operated unit, which has two electric hoists carriers with cab between, serves the whole department. It provides good end approach on either side of the building and, therefore, maximum coverage. The cab operator controls the unit as well as the transfer bridges.

Tubing up to 40 ft. long is carried either by wide canvas belt slings or a special lifting beam with arms which engaged with brackets on the storage racks. Each hoist has a capacity of 5000 lbs., 30′-0″ lift, and speed of 33 ft. Trolley speed is 150 fpm and bridge speed, 300 fpm. Hoists and trolley have variable speed drum control, and the bridges are provided with automatic acceleration. Hoist hooks are 16′-0″ apart.

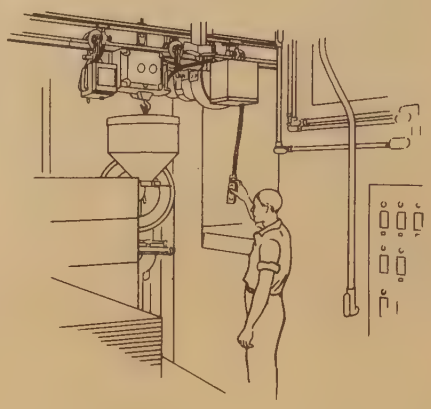
TYPICAL OVERHEAD CARRIER and CRANE OPERATIONS

Handling and Storing Large Rolls

A 6000 lb. grab with motions all motorized and controlled from the crane operator's cab is being used in handling and storage of large rolls up to 6000 lbs. with diameters of 24″ to 60″ and lengths up to 72″. There are three motors; one spreads and retracts the grab arms; another squeezes the roll grippers after they are brought close to the roll and thus locks roll in secure position and prevents possibility of slipping away and falling in transit; the third operates the turnover mechanism. This makes it possible to pick up a roll and change its position, from vertical to horizontal, for instance. The turnover mechanism can be operated while the crane is in motion, thus saving time, if a change is made from vertical to horizontal position, or vice versa.

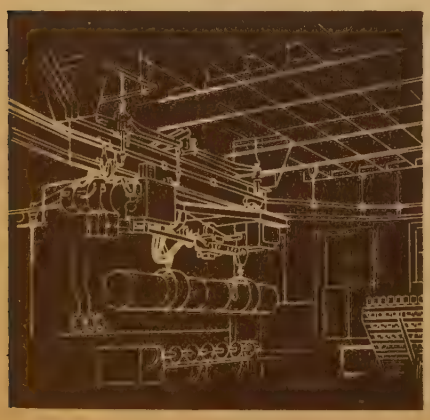
Overhead Rail Loops Aid Work

Two overhead rail loops with a number of hand-propelled carriers and electric hoists make possible, in a modern plant, a continuous and efficient operation when baskets of bullet cores are degreased by dunking in cleaning solutions.



Dispatch to Multiple Stations

This system was installed above a congested arrangement of tube forming machines to deliver slugs of semi-precious metal to each machine. Operator at a machine signals to a control panel where a light indicates the station requiring slugs. The stock keeper, after loading a special bottom dump container carried on the electric hoist hook, passes the carrier across a monorail scale section where weight of the slugs is registered. He then dispatches the carrier which travels to the proper machine and stops. The machine operator lowers the slug container by pushbutton control to fill his hopper. After raising the container, he returns the carrier to the stock room by pushbutton dispatch. This system, while accomplishing transfer of material to machines keeping accurate record of metal sent to each machine, is also used for transfer of finished tubes by return dispatch from each machine. Many systems of this type accomplish transfer of material or product, overcoming unusual travel conditions.

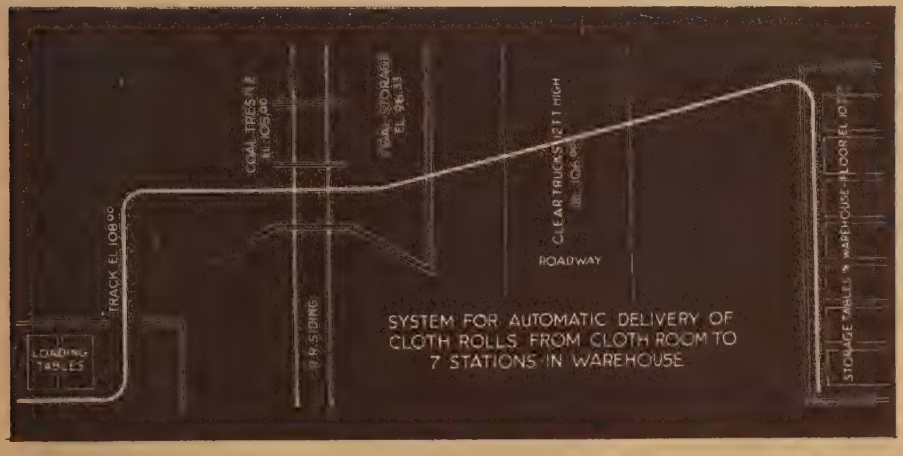


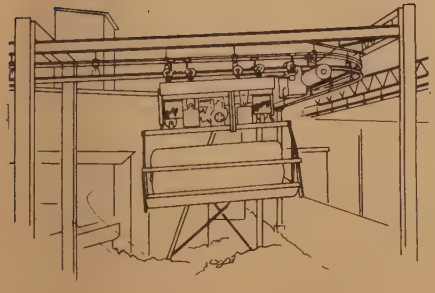
Selective Dispatch Between Multiple Stations

For intermittent transfer of materials between a number of different stations, all control and station selector devices are mounted on the carrier. This plan shows the track layout for operation of automatic carrier handling rolls of silk fabric between sixteen operation points. This system furnishes transportation over congested conditions, eliminating handling labor and protecting valuable material in transit. Accurate check is maintained by register of weight when carrier passes across a monorail scale section. Carriers consist of electric hoist and drive unit with simple station selector and pushbutton control apparatus mounted on counterbalanced arm, or other self-raising devices.

Minimum Maintenance

Because travel machinery is overhead away from dirt and hot metal, production interruptions and maintenance are kept at a minimum in this plant where every hour 675 molds are carried to the pouring section and then through cooling and shakeout areas on the continuous mold-handling system.





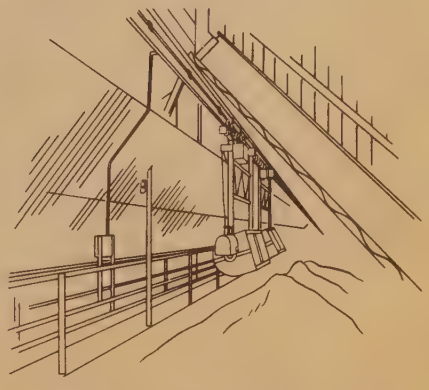
Load and Deliver to Multiple Stations

In this system a central control panel is set up for forty continuous trips of carrier between mill and warehouse. Carrier travels to either of two special loading tables, lowers a cradle which registers and receives an 800# roll of fabric from the table. Electric hoist raises the cradle to upper limit sending carrier on monorail track across the yard, up a 9% grade and into warehouse where it stops at one of seven receiving tables. Here, the cradle lowers to a tipping bar depositing roll on the table. Hoist again raises empty cradle to upper limit and returns carrier to another loading table in the mill for another trip. Carrier continues operation, making selective pick up and deposit according to pre-set control at central panel. When the 40 trip cycle runs out, the carrier stops nearby, and lights a signal to indicate its position.

All of the systems described above, while unique in many features, are built in most part from standard units. Through the application of simple electrical and mechanical devices they perform automatic operation with extreme accuracy and reliability, saving costly handling labor and supervisory attention.

Combined Floor and Cab Control

Light overhead hoist used to supplement a large heavy duty crane in assembly work. Both the hoist and the crane are arranged for combination floor and cab control, thereby making it unnecessary to utilize the services of a crane operator, when the requirements call for limited use and when the crane can be handled by the man placing the load.



Delivery to Movable Stations

From a fixed loading point carriers can be dispatched in either direction to movable stopping devices set at any point along the monorail track. The plan for such a system is designed to distribute fertilizer throughout a huge storage shed. Special buckets, mounted between rigid frames carried on trolleys, are loaded from mixers on floor above. When loaded, operator inches the carrier to the starting point where it is dispatched at 150 F. P. M. Upon reaching a stopping device the motor operated buckets dump contents in storage area below. Buckets then turn back to vertical position and the carrier returns to loading station at 400 feet per minute. Movable stop automatic dispatch systems successfully feed and remove materials between processes over extended areas, such as in the handling of tires between bagging press and Banbury cookers.

TYPICAL OVERHEAD CARRIER and CRANE OPERATIONS

Automatic Dispatch System Saves $2700 a Year

At this plant there is an automatic dispatch system that carries bobbins of asbestos yarn from the spinning room to the weaving dept. These departments are in two different buildings. The bobbins are delivered from the first floor of one building to the 2nd floor of the other building, located on the other side of the street.

The bobbins are placed in floor trucks which hold about 150 lbs. of asbestos yarn. Two of the loaded trucks are pushed into a box-shaped housing that has two doors. After the doors are shut and securely latched, a pushbutton mounted on the wall is depressed which starts the load on its way. After the load is hoisted to top position and held firmly to the traveling carrier, a contactor is engaged and the carrier started which travels on the overhead arch beam rail to the weave room in the other building.

The carrier stops automatically at the proper point in front of the doors at the weave room. The load is lowered to the floor by a person at this end who manipulates a push-button easily reached on the carrier. The filled bobbins are taken off and empty ones put on for the return trip.

Simply touching the "run" button on the carrier is all that is necessary to set it in motion for the return trip. The load hoists and as soon as the contactor on the carrier is engaged, the carrier is set in motion. When it reaches the spinning room it stops and the load remains with the carrier until it is lowered by depressing the "lower" button on the wall. The unit could be so designed that the load would lower automatically, but it is felt that it is safer to have someone hold a button depressed and watch the load as it is lowered.

Data on Installation

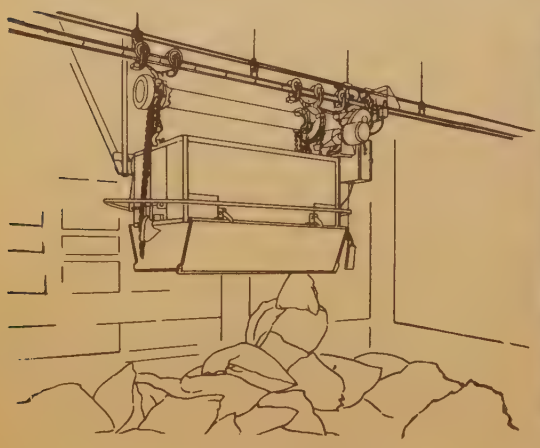
1. Two floor trucks loaded with asbestos bobbins are conveyed each trip. Each holds about 150 lbs. of asbestos yarn; thus 300 lbs. are hauled per trip.

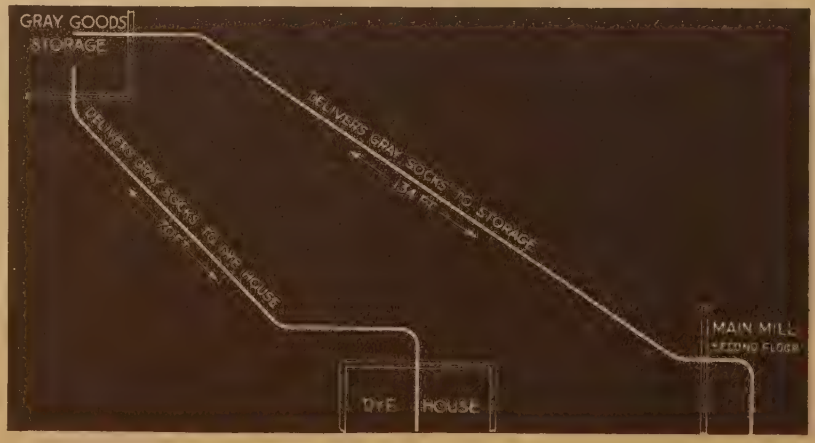
2. The plant operates two 8-hour shifts.

3. One man formerly was kept busy on each shift delivering the bobbins from one department to the other with the floor trucks. Now no people are needed especially for this work. Workers in both departments handle the loading and unloading along with their regular work without losing production because very little time is required in connection with the automatic dispatch system.

4. Men doing this work are paid 65c per hour. Their elimination means a savings of: 65c per hour x 8 hr. x 2 shifts x 5 days per wk x 52 wks.—$2704.00 per year.

5. The system paid for itself in 2 years.





Delivery to Fixed Stations

This system solved the problem of transferring looped grey goods from the main building to a warehouse 134 feet across the yard. The carrier in this system consists of a special bottom-dump bucket suspended from a twin hook hoist which is engaged to a rubber wheel drive unit called a MonoTractor. Grey goods in cloth bags are loaded in the bucket, and when raised to "up" position by chain hoist, the operator dispatches carrier by pushbutton control. Carrier travels across the yard, through swinging doors into the warehouse where it stops at a cut-off switch. Upon striking a bar at this point, the dumping device releases bottom of the bucket, discharging contents. A relay switch then times out, sending the carrier automatically back to the loading station. Another system between warehouse and dyehouse dispatches grey goods between the stations by pushbutton control from each station.

CONVEYORS

A FEW HIGHLIGHTS OF BELT CONVEYOR DESIGN AND CONSTRUCTION

- Ease of assembly and installation.
- Adaptability to variety of conditions.
- Strong, sturdy, enduring idlers, carriers and rollers.
- Standardized frames and sections.
- Anti-friction and other free rolling precision bearings.
- High efficiency driver transmission.
- Effective cleaners for conveyors.
- Special steel cable and cord construction for belts.
- High quality belt cover compounds that resist abrasion, oil, corrosive or chemical action and inhibit mildew.
- Impact mountings for conveyor idlers.
- Greater transverse flexibility and tension capacity.
- Longer belt lengths for fewer transfers and splices.
- Longer belt service.
- Skim coats between plies for added flex life.
- Breaker fabric over belt edges to minimize wear.
- Lower costs—first, operating, erection, power, and maintenance.
- Fewer parts subject to wear.
- Excellent troughing qualities of belts.
- Improved screw type and automatic take-ups.
- Both high and low coefficients of friction as desired or necessary.
- Provisions for bearing adjustment.
- Positive protection for bearings against dirt and dust.
- Idlers, carriers and bearings that are self-aligning.
- Interchangeable roll units for quick replacement.
- Flat and troughed carriers and idlers of improved designs.

BELT CONVEYORS

Improper and out-moded handling methods are responsible for the waste of billions of dollars in labor costs. No industry, therefore, can take them for granted. On the other hand, planned handling with modern methods and equipment can save money and manpower, reduce inventories and losses, and improve quality and volume of output.

There are fortunately a great number of materials handling systems on the market today for use in almost limitless fields of economical applications. This special materials handling section bears witness to that fact.

Conveyors of all kinds serve an important need in practically every industry. Some of the various forms of conveyors are belt, slat, apron, gravity and live roller, wheel, chute, pusher bar, overhead chain and trolley, drag chain, en masse, pneumatic, and others.

Furthermore, different forms of conveyors can readily be combined and coordinated into a complete system, or systems, in such a way as to eliminate re-handling, lost time, and damage to materials in process.

Belt conveyors are well suited to the handling of heavy materials at low cost per ton because of their large capacity, small power consumption, continuous delivery at comparatively high speeds, and the lightweight and simplicity of essential parts. Also thousands of arrangements, and combinations—and variations—are possible.

Materials of all sorts, in large and small volumes, can be carried by belt conveyors. Besides transporting coal, stone, chemicals, grain and other like products in bulk, they are used for handling parts, boxes, bags and packages. They are also employed in inspecting, sorting, filling, wrapping, labeling and other operations.

In general, flat belts are commonly used for packaged goods and for assembly, inspection and sorting work.

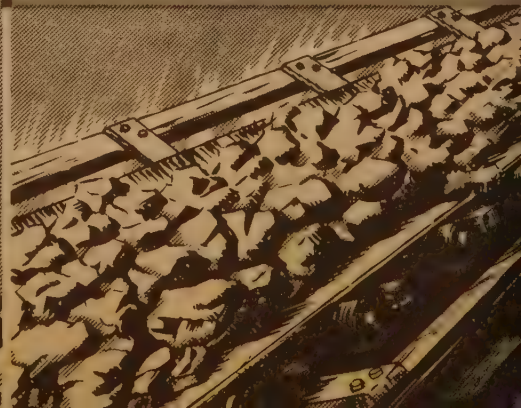
Troughed belts enable bulk goods to be handled in maximum volume.

Some of the improvements and new developments in the construction and design of belt conveyors are listed separately.

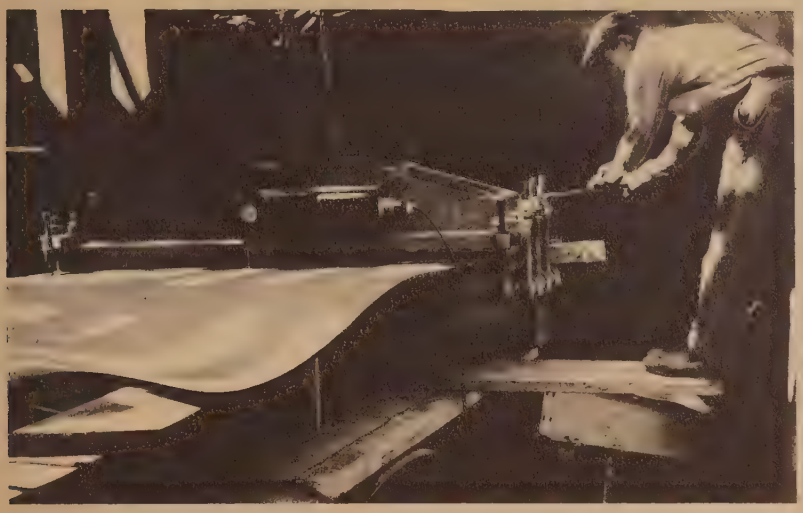
SEVERE SERVICES

Millions of pine logs smack this conveyor belt as they are dumped in it. Workmen stand and walk on it, too.

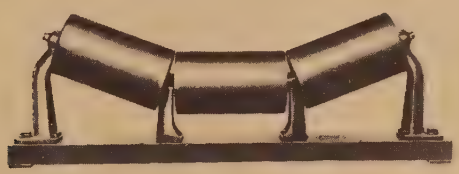
Conveyor belting has to take buffeting impact, constant flexing and other service stresses without breaking down.



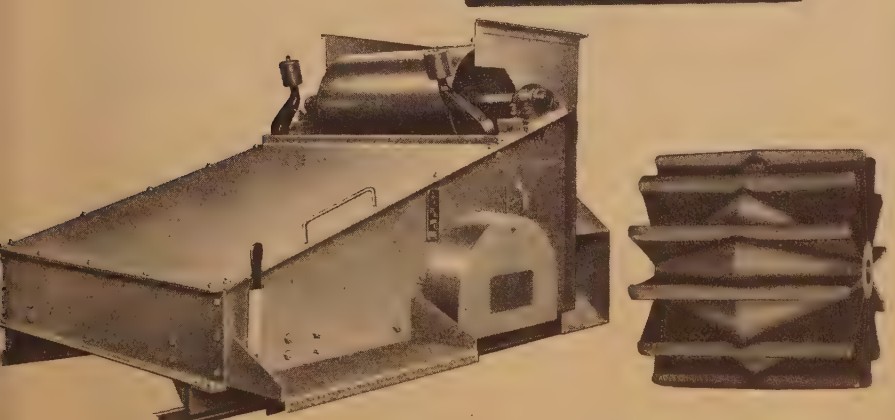
CONVEYORS



Splicing endless conveyor belt with vulcanizer.

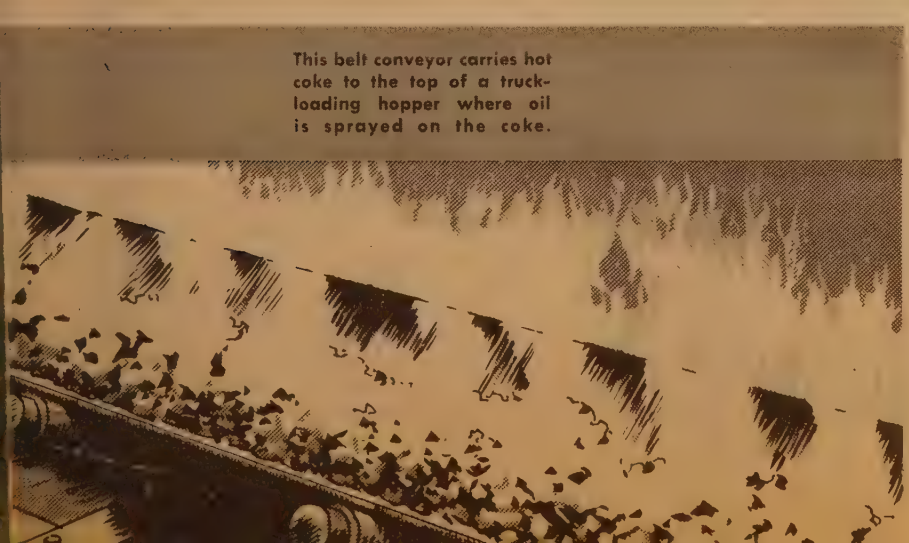


Troughed idler for carrying loaded conveyor belt and flat idler for belt return.



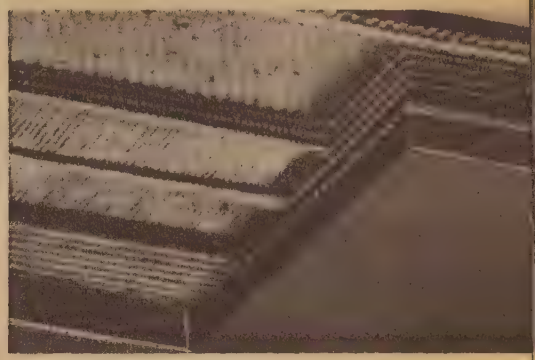
Trippers may be hand or self-propelled, the latter with either manual or automatic controls.

Wing type tail pulley which provides runways for the discharge of "dribblings."

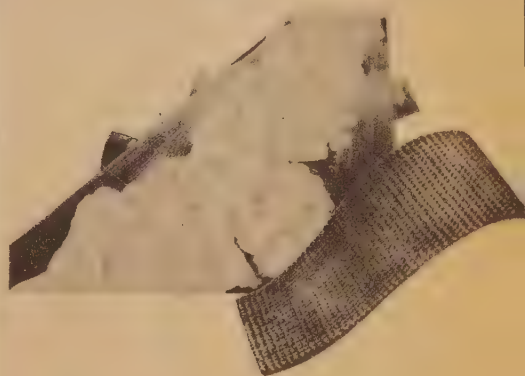


This belt conveyor carries hot coke to the top of a truck-loading hopper where oil is sprayed on the coke.

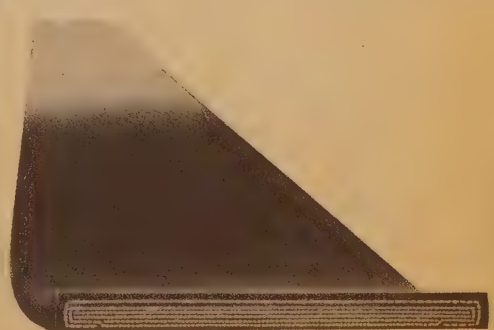
SOME REPRESENTATIVE CONVEYOR BELT CONSTRUCTIONS



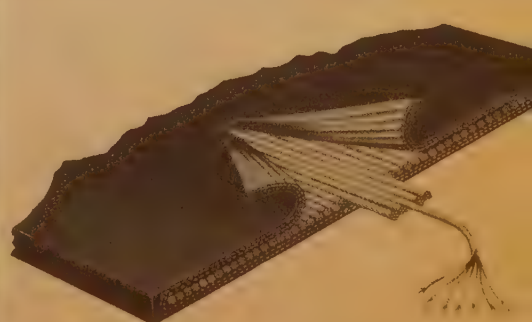
Cord construction for greater strength and transverse flexibility and fewer transfers.



Non-skid covers for inclined conveying where smooth surfaces would not provide sufficient traction.

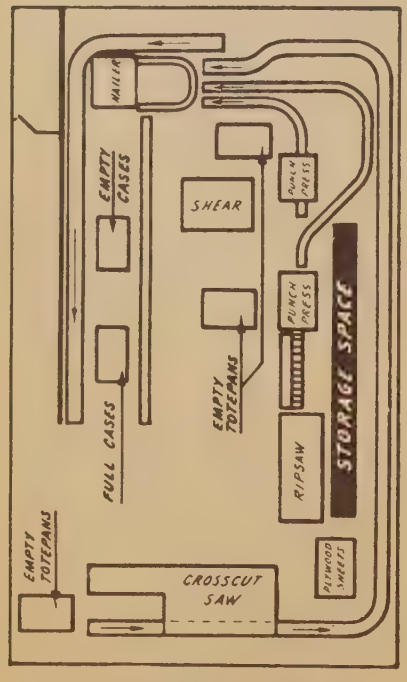


Highest quality friction and skim coat and high tension duck plies for severe conditions.



Steel cable construction for longer centers and high tension and load-carrying capacity.

HOW COMPANIES HAVE REDUCED MATERIALS HANDLING COSTS WITH CONVEYORS



Costs Drop From 15 Cents To 1 Cent Each

A new layout of operations for the conveyored handling of spools which are used to protect linoleum is expected to enable a manufacturer to cut his labor costs from 15 cents to an estimated 1 cent per spool.

This layout utilizes all available machines to such good purpose that a fast production is achieved with a minimum of special equipment. Hand transportation is eliminated by the introduction of gravity-roller, power-belt and wheeler-type conveyors.

Assembly Time Cut 60%

Whereas it formerly took a manufacturer 40 minutes to assemble a magneto, a new conveyor installation made it possible to reduce that time to 15 minutes.

After a study of the problem, engineers decided on a carousel conveyor. Running at a constant speed this conveyor provided an even flow, increased efficiency, and eliminated confusion and pile-ups around the machines.

Roller Conveyor Assembly Doubles Wages

Does a progressive assembly system on a roller conveyor pay where a small number of employes are used?

A washing machine plant in Illinois used 10 men who assembled an average of 44 machines per day, each man working and assembling a complete machine. A time study was made of the job, and the operation movements divided according to time between nine men, using the 10th as an inspector; and a roller conveyor progressive system was installed.

After a few weeks of practice these nine men assembled 207 complete machines per day, and later made an average of 220 per day, the men receiving more than double their former wages.

Conveyor System Saves $850 Weekly

The installation of a long conveyor run, some 1,000 feet, reduced operations to such a methodical state that $850 weekly was saved over a less efficient arrangement. The confusion and cost of hand-trucking was also eliminated.

Incoming parts, inspected by the receiving department, are placed in specially built trays and conveyed to the stock bins on the mezzanine. The dispatcher controls deflectors which switch the trays to any one of nine storage points.

From this storage the parts are conveyed to the assembly department on the main floor below the stock bins. Finished assemblies are again placed in trays and conveyed over a trunk belt conveyor to the shipping department.

Slower Conveyor Eliminates Handling

These painted propeller blades had to be allowed to cool for two hours. The blades formerly were taken off the conveyor and placed on wooden trucks to cool. Then they were returned to a different section of the line for further operations.

To eliminate this handling and rehandling, the speed of the conveyor was merely reduced by 50% and this reduction was compensated for by hanging the blades closer together. Now the same number of blades pass a given point on the line during a shift and the handling has been eliminated entirely, as the blades cool right on the conveyor.

By adding a drop-section loading and unloading unit to part of this overhead conveyor system, Nash-Kelvinator engineers made it possible for seven men to unload and perform a certain operation on 290 blades in the same length of time formerly required for handling only 120 blades.

Conveyor Reduces Labor Cost from 50c to 8c Per Case

A furniture manufacturer solved his labor problem by installing an automatic overhead conveyor system.

Under the old method labor was required to truck the cases from the first floor up the elevator to the second-floor finishing room; then return empty handed to the first floor. In addition, there were four different spraying operations in the finishing room and labor was required to hand truck the cases to and from the spray booths and pile the cases after each operation for drying.

There was about a 25% loss in time of the operator of the spray in waiting for cases, besides the possibility of cases being damaged. The old cost was about 50c per case.

With the new automatic overhead conveyor system no labor was required for trucking. Cases were assembled in the first floor cabinet room and put on the special conveyor truck which automatically traveled up to the second floor finishing room, where they continuously travel round the department to their various spraying operations, and into the drying room. When finished they go into the packing and crating room.

After drying, the cases are wiped while on the conveyor, then continue their journey on to their other operations. The operator is kept constantly employed, with no loss of time, at a cost of less than 8c per case. A better job, less chance of damage to cases and more money for the operators, with high productivity and an enormous saving are the economies effected.

Exceptional Savings by Hard-Facing the Flights of Screw Conveyor

Exceptional savings have been effected at a Michigan cement plant by hard-facing with Stellite rod the flights of screw conveyors. The average life of an ordinary screw is 5 weeks, whereas hard-faced screws run 25 weeks, or 5 times as long.

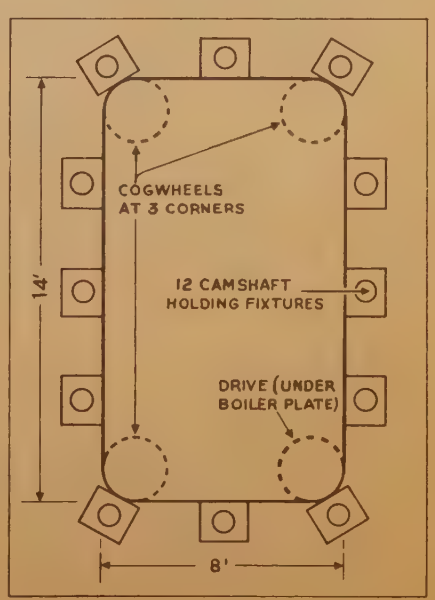
This plant reclaimed three 6 in. conveyor screws with 7½ lb of Stellite, 300 cu ft of acetylene, 290 cu ft of oxygen and 9 hr labor. The total cost for labor and materials was $57.45. Since the cost of three new conveyor screws would have been approximately $570, the hard-facing process saved this plant $512.55 on one job alone.

Conveyor Paid for Self in Month

Assembling the camshaft timing gear to the shaft at the Ford Rouge plant required five operations and these formerly were performed on stationary fixtures. Each operator put the parts or subassembly in a fixture and performed certain operations, then took it out of his fixture and passed it on to the next operator, who, in turn, placed it in his fixture and performed his operations on it.

To eliminate putting the subassemblies in fixtures and taking them out again, a table, 14′ x 8′, covered with boilerplate, was set up and a conveyor was attached to, or suspended from, the edges of the table with 12 fixtures on it. The fractional hp drive is located at one corner of the table and a cog wheel is located at each of the other three corners to turn the conveyor chain.

The conveyor installation cost about $400. A bank of parts is carried on the table as a reserve. Now a camshaft is placed in one fixture on the conveyor and it remains in that same fixture while being conveyed from one work station to another until the subassembly is completed. Elimination of excessive handling on this operation effected a saving of 16 man-hours a day. At $1.33 an hour, this saving totaled enough to pay for the conveyor installation in about 20 working days.



CONVEYORS

SOME HIGHLIGHTS OF MODERN ROLLER AND WHEEL CONVEYORS

Adaptability to a wide variety of applications.

Improved design and construction.

Light-weight sections for easy portability.

Rollers of steel, brass, aluminum, cast iron, maple, and various alloys.

Formed steel, one-piece frames.

Sturdy cross-member and center supports.

Easy adjustability and coupling.

Reversible curve sections.

High grade, hardened steel anti-friction bearings.

Special oil impregnated, self-lubricating bearings.

Quick-adjustable standards and tripods.

Rugged construction and mechanical excellence.

Self-aligning, dust- and moisture-proof housings for bearings.

Grease packed bearings with inner and outer shields.

ROLLER AND WHEEL CONVEYORS

Conveyors in which wheels or rollers support and move the load are economically applied to the low-cost handling of practically any commodity having one smooth, firm riding surface.

They may be advantageously employed in level lines where the goods are pushed along, or a slight slope may be provided to the line to take advantage of the pull of gravity.

Roller conveyors can also be made "live" by belt action or by a transmission chain-drive arrangement.

ROLLER CONVEYOR ECONOMY

AUTOMOBILE MANUFACTURING PLANT
CONVEYOR INSTALLATION COST $5,000.

SAVINGS

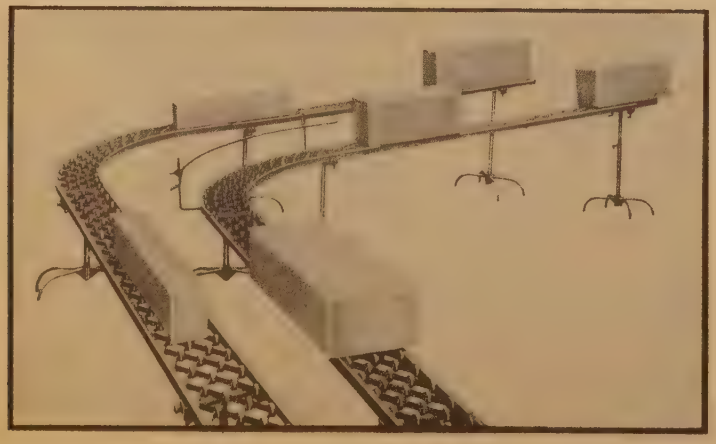
Effort 50%

Time 25%

Space 15%

FEATURES

Paid for self in 12 months.
Improved working conditions.
More flexible scheduling of work.



Light weight, portable conveyors handle many materials at low cost.

Parts are progressively machined alongside this live roller conveyor. Loop handles parts for special machine operations.

Movement of supplies and goods for shipment made easier by roller conveyors.

HOISTS and
CHAIN BLOCKS

SOME HIGHLIGHTS OF MODERN CHAIN, AIR AND ELECTRIC HOISTS:

- Wide range of capacities, lifts and speeds.
- Simple, compact, and practical designs.
- Easily accessible parts.
- High over-all mechanical efficiency.
- Safe, smooth, quiet operation.
- Standardization and interchangeability of parts.
- Low operating and maintenance costs.
- Machine grooved drums and guarded drum flanges.
- Highest quality anti-friction bearings.
- Super-tough chains, proof-tested before installation.
- Cables of highest grade flexible steel hoisting rope.
- Brakes of advanced design.
- Balanced gearing and lasting drive mechanisms.
- Operating parts sealed against dust, dirt, and moisture.
- Motors specifically designed for hoisting service.
- Positive safety stops and cable anchorages.

HOISTS AND

Hoists are economical and practical handlers of materials. They make the movement of heavy cumbersome items simple, safe and easy with a minimum number of operations. They speedily lift, carry, lower and deposit loads at specific locations, thereby eliminating rehandling.

Basic designs include hoists for general utility, close clearances, stationary mounting, trolley travel and other specific purposes. Types of hoisting equipment are chain, air and electric.

The use of modern hoists and chain blocks saves time and money, lowers manufacturing costs, improves working conditions, increases worker efficiency, gives impetus to production, and otherwise helps the manufacturer to "make a profit from moving materials as well as from manufacturing materials."

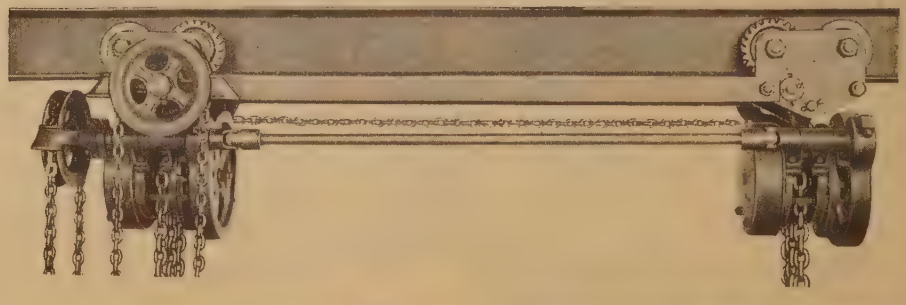
CHAIN HOISTS

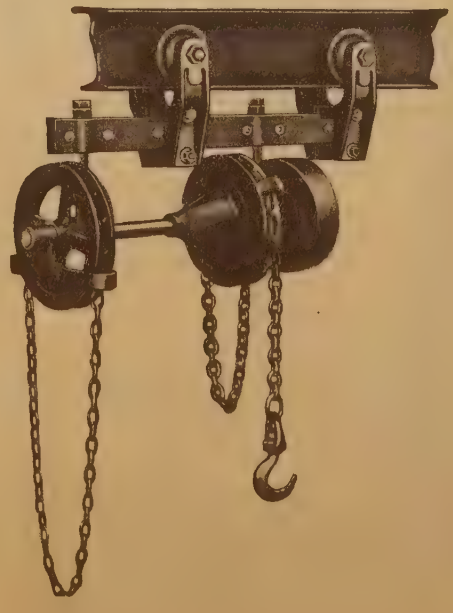
Chain hoists commonly consist of sheaves, gears, hand and load chains, and support and load hooks. The mechanisms are such that a pull on the hand chain activates the sheave and load chain through a differential or geared arrangement.

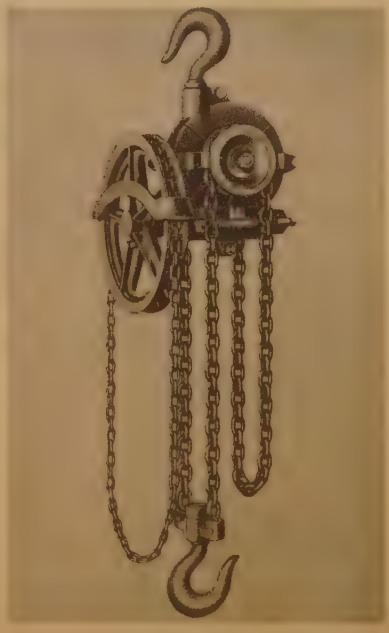
In a simple differential hoist an endless chain is looped continuously through upper and lower sheaves. The loop supporting the lower load block is considered as the load chain and the free loop is used as the hand chain.

In the geared arrangement the enclosed gears may be of the spur or worm types. The last named is often called a screw hoist. Here the hand chain pull is transmitted to the load chain by the reduction gearing.

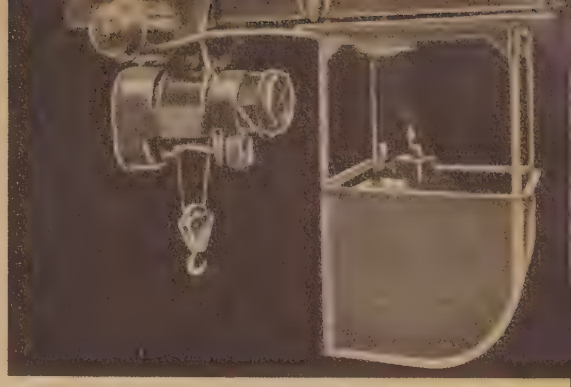
Chain hoists are supplied in a variety of designs and capacities.







CHAIN BLOCKS

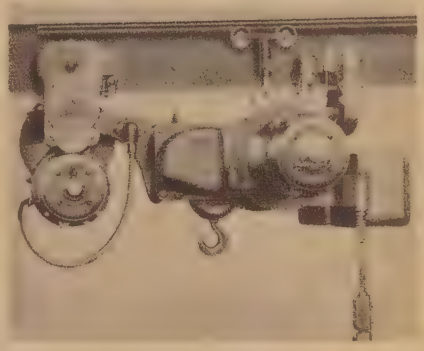


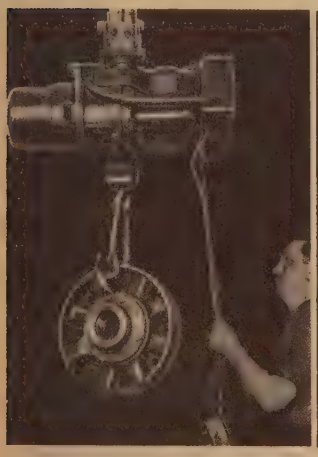
ELECTRIC HOISTS

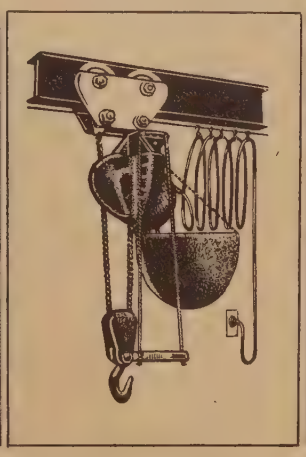
Electric hoists are offered in a wide variety of types, sizes, capacities, operating speeds and lifting heights. Mountings for stationary overhead use can be of bolted contructions or hook suspension devices. For overhead crane, tram rail, or monorail track travel, the trolleys may be of the push, hand-chain gear operated, or motor driven types. Base mounted hoists also find economical employment in drawing loads laterally, for opening and closing doors and other similar applications.

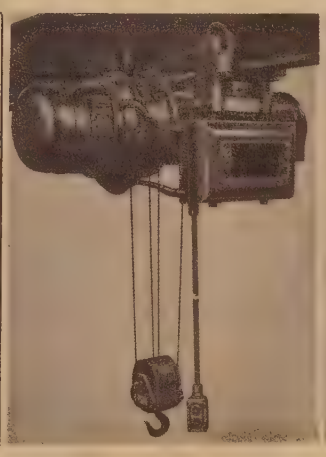
The motors of electric hoists are specially built for the service. They are usually controlled from the ground by pendant ropes or pull cords, or by push button devices. Variable speed devices are likewise available. Many floor operated electric hoists can be converted for monorail cab operation.

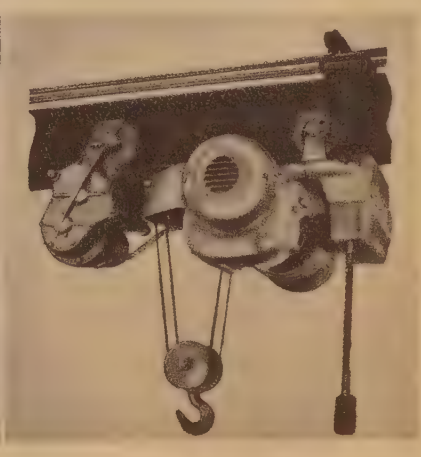
Among the recent developments in electric hoists are the modern portable ones designed to serve varied industrial requirements. They can be readily hung up, easily plugged into the nearest electric socket and put to work immediately.











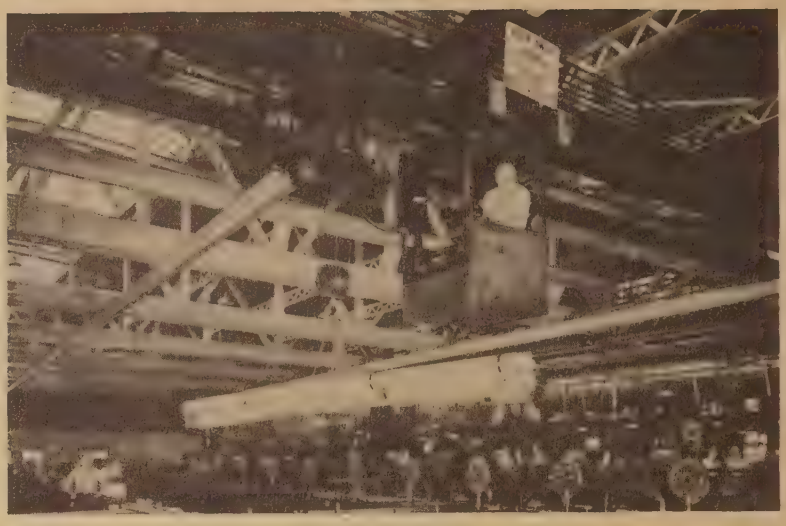
AIR HOISTS

Hoists operated by pneumatic power may be of the long-stroke piston or of the air-motor kind.

In the former the air pressure forces a long-stroke piston back and forth in a cylinder. These hoists may be mounted vertically or horizontally. In the horizontal position, sheaves are attached to the piston and to the other end of the cylinder. A wire rope, one end of which is made fast to the hoist, loops over both sheaves. The load hook is attached to the other end of the rope, which hangs down from the hoist. The outward stroke of the piston shortens the load lifting section of the rope for the lift.

Two types of air motors for hoisting purposes are the radial piston-cylinder and the multi-vane kinds. The hoisting drum is commonly driven through a spur gear or worm reduction. Automatic brakes are employed where necessary to hold the load.

HOW COMPANIES HAVE REDUCED MATERIALS HANDLING COSTS WITH HOISTS AND CHAIN BLOCKS



This cab-operated electric hoist picks up and delivers the heavy bar stock to the automatic screw machines.

Control of an electric hoist from the ground makes its operation simple for handling many kinds of materials.

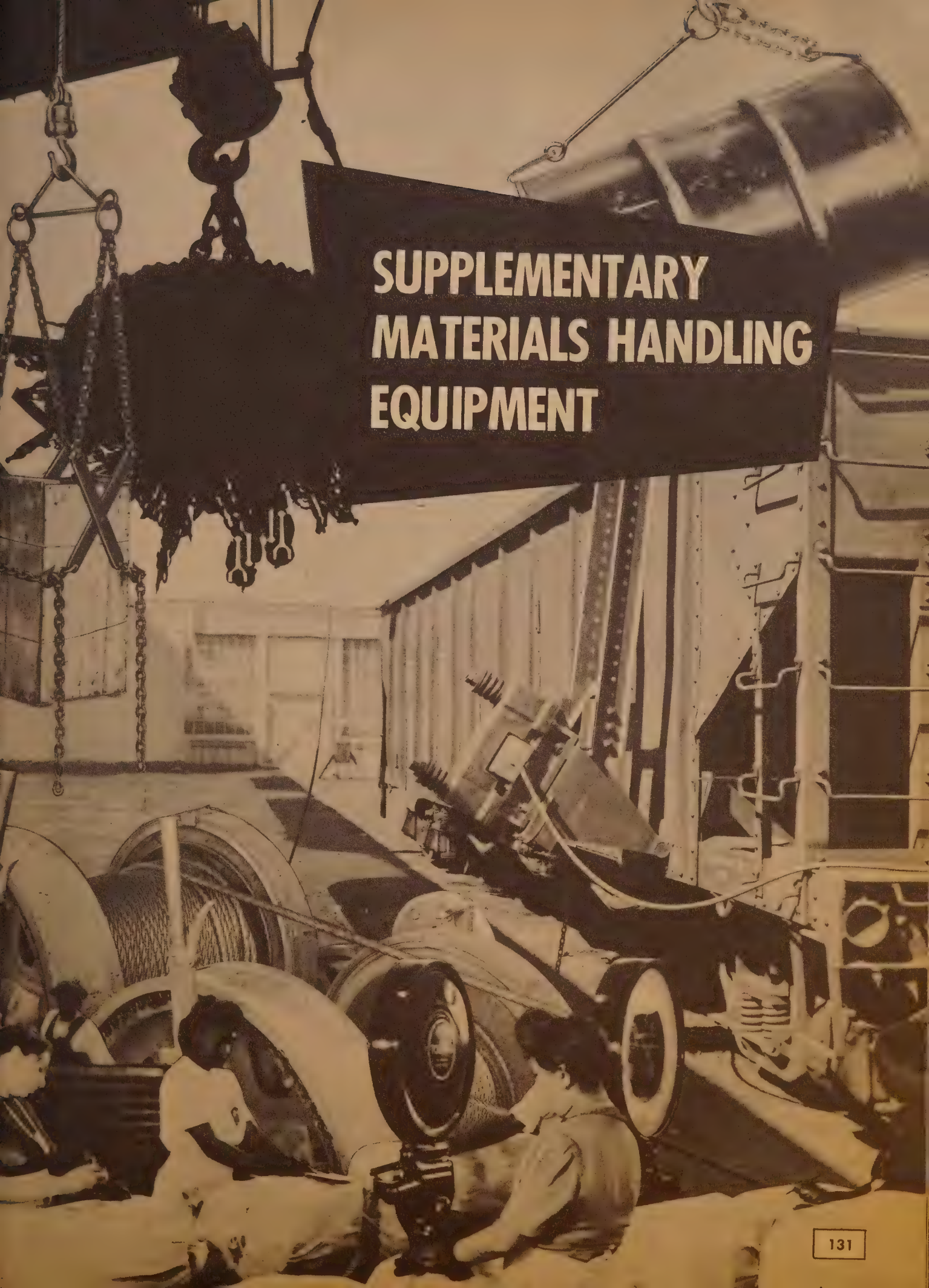
A light-duty electric hoist suspended from a portable stand lifts and positions work pieces in the machine tool.

A chain hoist mounted on stiff-legged portable frame takes the ache out of mounting and removing engines from airplanes.

Heavy casting molds are handled by chain hoists for storing in racks at different levels and varying locations.

Freight cars are loaded safely, swiftly and at low cost with a trolley mounted hoist running along an overhead track.

Hoists on cranes provide one of the most flexible and convenient means for moving weighty goods with dispatch.



SUPPLEMENTARY MATERIALS HANDLING EQUIPMENT

STEEL STRAPPING

Wartime uses of steel strapping for the packaging and bracing of loads for shipping increased greatly in number, ingenuity and effectiveness. Behind this was the fact that goods lost or damaged in transit did not mean mere dollar values, they often were irreplaceable. More kinds, sizes, shapes, weights and relative fragilities of shipments were found, leading to still further advances in the strapping art. And pushing the program forward was a dire shortage of crating and bracing lumber, demanding the utmost use of the benefits of steel straps and other means to reduce lumber useage.

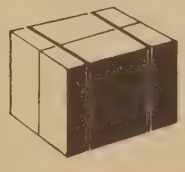
Materials loads were reduced to production unit bases in accordance with the materials handling equipment available, and often the handling tasks were to be divided between two points on a shipping line or a railroad. One example: man load units up to 70 pounds, hand lift truck units to 500 pounds, power lift truck units up to 1000 pounds, each unit to be conveniently strapped to a pallet or other device.

Strapped units are used for storage, either by unit weight or unit gross count strapped together, or by unit collection of all the parts needed for a batch or a subassembly or an entire assembly, etc., the strapped units being protected against damage until used and also keeping inventory accurate by preventing "borrowing" and pilfering.

Straps developed more production line uses, to hold parts against sagging or shifting while being stress relieved, to keep loose or clumsy parts from shifting or protruding while in materials handling transit, to keep either fragile or dangerous devices in place on either moving or stationary supports.

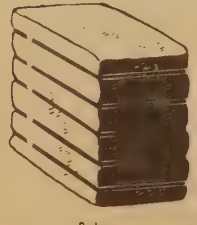
Straps also have many outright mechanical uses to hold down the covers of bearings and prevent accidental opening or deliberate tampering, to fasten temporary or permanent safety guards together, to support long cables so they do not have to carry their own weights, to hold subassembly parts together until they can be tack welded, permanently welded, or otherwise finally fastened.

Typical Uses of Steel Strapping



Cartons

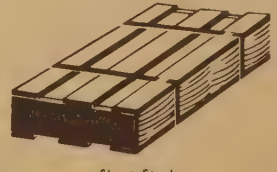
Rolls of Paper



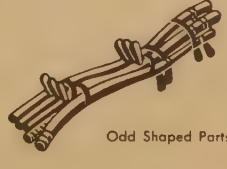
Bales

Metal Bars

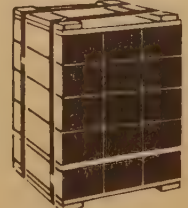
Packaging Formed Pipe



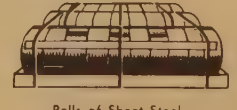
Sheet Steel



Odd Shaped Parts

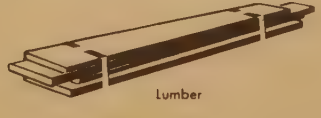


Cartons of Pallets

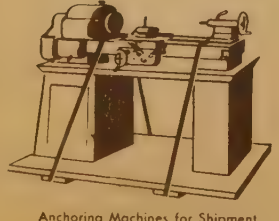


Rolls of Sheet Steel

Baskets

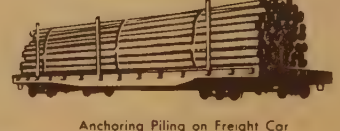


Lumber



Anchoring Machines for Shipment

Anchoring Tanks on Freight Car



Anchoring Piling on Freight Car

Anchoring Heavy Freight Load

INDUSTRIAL TRUCK WHEELS AND CASTERS

Industrial truck wheels and casters are among the simplest and most adaptable materials handling devices. They can be made quickly, applied quickly, changed easily.

These abilities were exactly what war conditions needed. Therefore the war years saw these wheels applied to more and harder problems than ever before.

Operating conditions were exacting. Floors over which the wheels rolled often were in bad repair, perhaps crusted with grit filled lubricants or with chemicals or littered with metal or other debris. Travel per wheel per day often was in miles where it previously had been in hundreds of yards. Employes were less careful. The demand for speed led to shock loading. Replacement wheels and casters could not be had as rapidly as needed; service lives had to be maximum.

All of this led to developments, some of which are just appearing, or soon are to appear, as peacetime products.

Stronger wheels are being made for heavier loadings. The steady loads while trucks are standing still, shock loads while materials are placed in trucks or while filled trucks are picked up by crane and returned to the floors, running loads while trucks travel at higher speeds than ever, concentrated loads when booms or hoists or other overhung or unbalanced devices on the trucks impose disproportionate shares of loads on a few wheels, all are on the increase. Increased strength is coming from better balanced designs, use of stronger and harder materials, thicker walled stampings, more forgings.

Development of special machine tools or specially modified toolings to make wheels and casters has resulted from high production war demand, is making the production of better designs economical.

Better locking and fastening devices for fastening the wheels and casters to the trucks or to other devices which the wheels must carry are adding to adaptabilities. Quicker action and more positive floor locks which are made as parts of the wheel assemblies are making it easier to position trucks for loading, unloading, storage and safety.

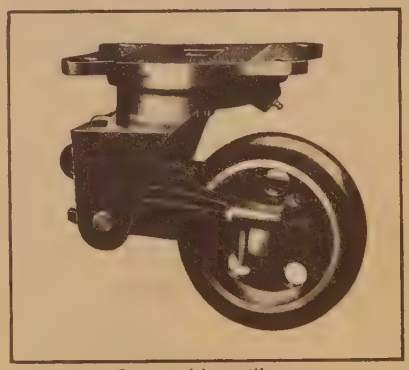
Thread guards, other guards to make wheels more adaptable to special operating conditions and hazards, have increased and improved.

Spring actions built into wheel assemblies have proven highly beneficial for the handling of fragile materials. In addition, these actions reduce the effort needed for pushing a heavily loaded truck over an uneven floor, reduce the tilting or spilling of truck contents, permit more shock while loading a truck and therefore greater rapidity of some loading motions, dampen the vibrations and reduce the noise which can be objectionable in operation.

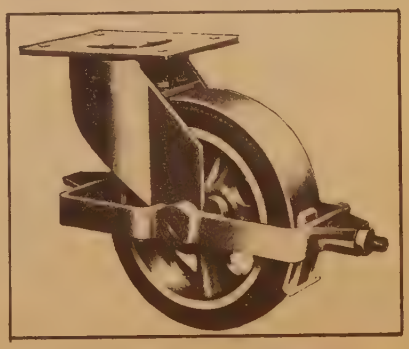
Pneumatic tires were a prewar development; they are being improved by the use of synthetic rubbers and other materials which resist abrasion better and are not damaged by being soaked in oil. Plastics in tires and in other wheel parts are showing high endurance plus considerable reduction of operating noise and greater protection for floors. Their continued development may be expected.

HIGHLIGHTS IN MODERN WHEEL AND CASTER DESIGN

- Precision anti-friction bearings
- Dirt seals to protect bearings
- Wheels and casters of plastics and other new materials
- One-piece aluminum alloy castings
- V-Groove casters for use on angle irons and other tracks
- Dual wheels and casters for exceptionally heavy loads
- Pneumatic tired wheels
- Static-resistant materials
- Spring suspension mounting to reduce shock
- Improved fastening devices

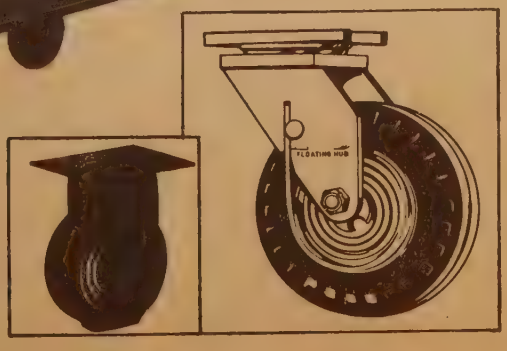


Caster with cantilever spring suspension

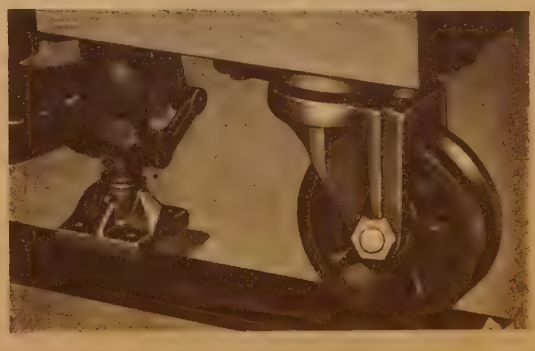


Grooved type caster

Steel caster with wheel brake



Types of spring suspension



SOME OF THE HIGHLIGHTS OF RECENT DEVELOPMENTS IN BASKETS, BINS AND BOXES ARE AS FOLLOWS:

BASKETS

Wire meshes of different sizes and materials to meet wide range of requirements.

Varying shapes and fittings.

Excellent drainage features.

Welded frames of steel.

Nickel chrome and Monel metal constructions available.

Revolving type.

BOXES

Sturdy metal construction for heavy loads.

Wood and wire boxes reinforced at corners for lightweight products.

Large skid boxes.

Trucks specially designed for moving boxes.

Advantageous arrangements at machines.

Inclined front ends for easy access.

Special racks with compartments for holding boxes.

BINS

Simple bench types.

Hopper designs.

Different sizes for varying purposes.

Rotary constructions on standards.

Racked with forward tilt.

Wedge shaped drawers.

Multiple arrangements possible.

Steel tote boxes of stacking type are found highly convenient in connection with many different press operations.

BOXES, BINS AND BASKETS FOR HANDLING SMALL PARTS

When we speak of *small* parts and products, the adjective used is a relative term. In the restricted sense of handling, we refer to those parts and products, of whatever form or kind, that are too small to be handled to as great advantage individually as collectively. Handling of such parts and products is usually a distinctive problem in any plant processing them in considerable volume, and is a matter of great importance industrially. In many cases, operational aspects are involved; parts can be handled collectively through various operations by the use of correct auxiliary handling equipment or containers.

As in other types of handling, however, transportation of parts or products is usually involved, and the various container-type handling units employed, for holding parts collectively, may in turn be handled by truck, crane, hoist, conveyor, monorail, etc. In not a few instances, a "tailor-made" system of handling small parts is found, where both the containers for the small parts, and auxiliary equipment for some of the larger standard handling units mentioned, have been engineered and built to work together to highest advantage.

In addition to considerations noted above, the storage factor is very often definitely involved. Very small parts can no more be placed into and removed from storage to advantage individually, than they can be otherwise handled. This angle of the situation has been given much attention. Consequently, containers holding small parts or products which can be used for storing those parts, in a minimum of floor space, and in such manner that they are always readily available, are contributing largely to efficient handling in many places.

This problem is by no means the same everywhere. There are some places in which baskets of different kinds are chiefly used. There are others in which tote boxes or pans are employed to the greatest extent. In plants where the storage factor is more than ordinarily important, bins and racks of different kinds often hold the chief place in handling. Special trays are very often used in connection with other types of handling equipment, and there are a few instances where bags are used to advantage, though these are in the minority.

Baskets

Baskets of different kinds are more often used for handling small parts and products through actual operations, than any other kind of small-parts handling container. The reason is highly apparent—a basket allows ready entrance of fluid around the charge of parts it contains, when submerged, and also permits of good drainage when lifted. A properly designed basket is therefore admirably suited for handling small parts through dipping operations of various kinds, including those in which the charge may remain submerged for a considerable length of time.

On the other hand, baskets are sometimes used for pure handling, and for handling in different operations, where no fluid application is involved. They are found in use with centrifugal machines. One sees them in connection with galvanizing operations, and also where annealing, hardening and quenching of small parts are involved. Brazing, plating, drying, degreasing and pickling operations on small parts are all conducted with the aid of baskets of different types. Many different size wire meshes are available, and baskets are made in many different shapes, fitted with different kinds of handles and balls. They may be designed for handling parts of relatively light weight, or for carrying very heavy loads, as the need may appear. In the latter case, they usually have welded frames of steel.

Revolving Type

Many times, it is necessary to process small parts of cupped type, or parts having recesses in them, through some kind of dipping and draining operations. For this purpose, baskets of revolving type are generally used. These are so designed as to be supported on their axis, and are therefore easy to revolve after they have been lifted. Revolving them slowly allows any excess liquid, trapped in cups or recesses, to drain. Mesh-type baskets are also made of different analyses of wire, depending on the duty they are to perform. Pickling baskets are often made of nickel chrome or Monel metal. Nickel chrome also withstands heat well, and therefore is much used in making annealing baskets and trays. Plain steel is employed for many of the more ordinary uses, and different stainless steels are used in various

cases, where it appears advisable.

There are various special carriers for small parts and products, that could not rightly be termed baskets, though they are quite closely allied. Some of these are referred to as work-holding crates, and others are really racks, upon which the work can be laid or arranged in a convenient manner for processing. Whatever the problem, some kind of processing carrier can be designed and built to meet it.

Tote Boxes

The source of the word "tote" is uncertain, but it always has reference to carrying or transportation. Tote boxes, as we know them in industry, were doubtless practically all of the lighter type, that could be carried manually in the old days. Recent practice, while still making room for boxes that can be manually carried or dragged from place to place, also includes the use of tote boxes entirely too large for this, which may be transported by crane, monorail or truck.

In most cases, tote boxes and pans are made of metal, for the greatest number of them are used in the metal-working industries, where the loads they carry are heavy, and where they must incorporate a great amount of stamina. However, there are some instances in which products and parts of relatively light weight for their bulk are to be handled, in which it is advisable to use boxes made of lighter material. Thus, we find boxes of wood-and-wire construction, reinforced with sheet metal at their corners, in use in various places. This type of tote box is much used in handling glassware. Large skid boxes of this kind are used in connection with trucks. There are also regular stacking boxes, in addition to wood trays. Stacks of tote boxes of this kind are moved about on small hand trucks, or on castered dollies, in different cases.

Special Units

The fact is that some leading manufacturers of trucks have designed and built special units for the specific purpose of moving tote boxes from place to place. Using such a truck, it is a simple matter to lift and transport a heavily laden tote box, and some of these trucks will easily lift and carry a number of stacked tote boxes. Many tote boxes used today have been specially designed and made with regard to stacking. It is highly evident that the ability to stack boxes several high results in a great saving in floor space, whether such stacking is with particular reference to storage, or whether it is on the machine floor.

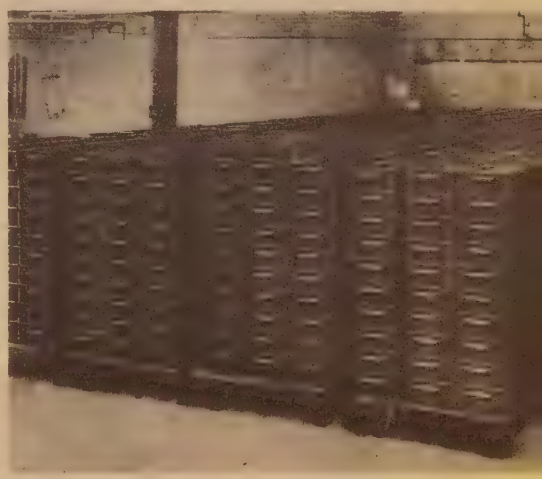
However, there is another phase to handling products and parts in tote boxes, that often surpasses in importance the stacking angle. This is the use of special racks, made with a large number of compartments, each of proper size to receive and hold one standard-sized tote box. Such racks can be built in the individual shop, but it is found better in most instances to have them fabricated by the firm making the tote boxes. The great advantage of such racks lies in the fact that any desired tote box, with its contents, may be removed and replaced, as the occasion may require, without excess handling or disturbing of any other box or tote pan in the rack. In plants having a multiplicity of small products, that can be handled to advantage in this manner, this system allows of storing the various types of products or parts, in various lot sizes, and drawing on any particular kind for further processing, or for use at any time, while everything is kept in perfect order at all times.

Arrangements at Machines

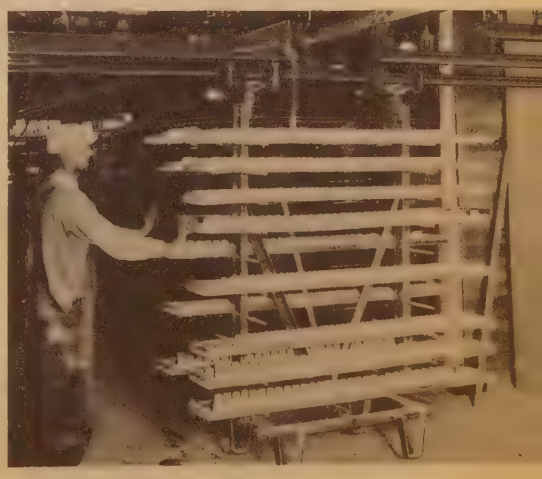
Very often, special arrangements can be made at machines, to facilitate handling small parts by the tote box method. For instance, some machines producing small parts are arranged to deliver them, when the operation is complete, through a chute into a tote box located below. In one instance, we noted a press used for blanking small parts, which incorporated a flat conveyor made of silent chain. The arrangement was such that the blanked parts dropped down on top of this conveyor, and were delivered by it to a chute behind the press. Here, the parts were chuted directly into a tote box, anchored on the high end of a gravity roller conveyor. As soon as a tote box was full, it was allowed to proceed on down the gravity roller conveyor, to the next working station.

There are also many instances in which air blast valves are used in connection with the press, for blowing small workpieces from the dies into an adjacent tote box. This is done by running a compressed air line to the press, with a nozzle properly directed. The arrangement is such that the motion of the press ram will operate the valve, thus tim-

Wood-and-wire stacking boxes are used in this lamp company's plant in connection with machining operations.



A great number of tote boxes may be stacked on skids for transportation with any standard lift truck.



A special rack-type carrier handling removable trays is used in conjunction with a monorail system.

The economical usefulness of bins like these in the assembly of small parts is easily apparent.

The five trays on this rack-conveyor hold a total of 170 precision gears which are easily accessible.

The prongs on this special truck fit under the handles of a standard tote box to lift and transport it with little effort.

Because of the ease with which they may be stacked, these hopper-front bins can be adapted to practically any space.

ing the air blasts with the press action perfectly. Such air blast equipment is available for presses from a number of sources.

Tote boxes are sometimes arranged for ready pouring of the parts they contain. We have observed some instances in which extra large tote boxes were carried by monorail, using a dual hoist layout for manipulation. These boxes had one end strongly inclined for easy pouring. By lowering with the hoist located at the inclined end of the box, while the opposed hoist remained stationary, the box could be tilted and emptied at any desired point along the course of the monorail system.

Inclined Front Ends

There are cases, too, where tote boxes are made with inclined front ends, where the idea in mind is more that of providing ready manual access, when the boxes are in stacked formation, than of pouring. When this factor comes into view (and it is one of great importance in many places) tote boxes begin merging their characteristics with bins, and the fact is that some refer to such units as stacked bins, rather than stacked boxes. Terminology is a matter of relatively small importance, so long as one has the type of handling unit that will do the work in hand to the highest degree of advantage.

Bins

It is a fact, however, that bins of different kinds are very important in the handling of small parts industrially. Many of them, that have been found exceedingly useful, are less closely related to tote boxes than the ones cited above. Some of these are particularly valuable for plants where assembling operations call for the use of a large variety of small parts, all of which are required to be kept within easy reach.

So-called assembly bins are often designed to set on a bench. Some are of relatively simple type, and others of hopper design. These bins are sometimes held in racks, with a slight forward tilt, so the parts they contain will naturally gravitate toward the front. Similar bins are also used beside machines, jigs or fixtures, whenever manufacturing conditions indicate they will be convenient. They are employed in many different sizes, depending on the size of the parts to be held and the relative number of such parts used. Some assembly bins hold as little as a half-pint, and others as much as a peck.

Rotary Bins

Rotary bins have also been found exceedingly helpful in many places. Such bins are in use that have a single standard, arising from the center of a heavy circular base. On this standard are placed a number of round sections, one directly above the other. Each of these sections is arranged to rotate independent of all the others, in either direction, on a ball bearing assembly, and works with perfect freedom, whether loaded fully, or unequally. These units are sometimes arranged with dividers for each section, the dividers being radial. As many or as few dividers can be used in each section as one may desire. In some instances, where such bins are meant only for storage, compartment bin fronts are used. In others, wedge-shaped drawers or pans are used. In fact, compartment bin fronts can be readily removed, to allow insertion of drawers or pans.

It is certainly worthy of note that bins, boxes, pans or trays, arranged in multiple, in special racks, need not be regarded as stationary. There are many places in industry where such assemblies are arranged for ready transport, without disturbing their component parts, as occasion may require. Special racks are made for traversal by monorail, which will carry a large number of loaded trays through different operations. Some very fine trays are provided with retaining flanges around three of their four sides, so they are in effect boxes with one open side. These are mounted in spaced-height formation on special trucks, designed for holding and carrying them. These trucks serve either to carry the parts from operation to operation, or as temporary storage depots for the stock, when required. This really represents a very remarkable advance in handling methods in many machine shops. These trays are seldom handled manually while they are loaded. For that reason, they may be loaded very heavily.

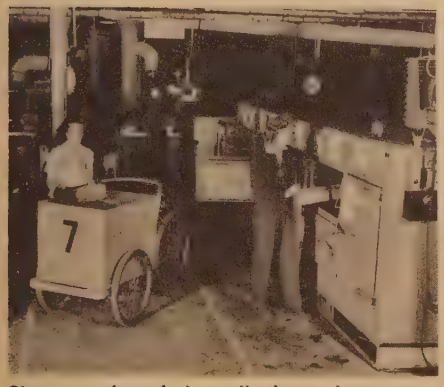
To a limited extent, bags are found useful in handling certain parts, that do not pass through many operations. Little need be said of this aspect of small-parts handling in general. Obviously, ferrous metal parts in very heavy bags can be handled by magnet, without spilling or trouble, when such bags have been properly closed.

One very interesting aspect of bag-handling small parts is the proposition of using cellophane bags for holding small parts for assembly, for repair, etc. Cellophane bags are particularly advantageous when very small parts are to be packed and handled in specific lot sizes, and when there are various kinds of parts to be so handled. The transparency of such bags allows an operator to actually see the parts in each bag, though they are positively segregated from those in all other bags. This also makes a splendid method of keeping specific types of repair parts ready for quick dispatch, as the occasion may demand. Such bags are entirely vapor- and moisture-proof, which is a factor adding greatly to their popularity, for handling small ferrous parts.

HOW COMPANIES HAVE REDUCED MATERIALS HANDLING COSTS WITH BOXES, BINS AND BASKETS

Wood-and-wire stacking boxes can be mounted on low dollies for easy transportation from one operation to another.

Designed for use with a monorail carrier, this tote box can be emptied after transport to any point along the system.



Rivets packaged in cellophane bags are placed in special expanded-metal baskets for delivery in a refrigerator-tricycle.

Tote box in process of receiving a charge from a machine adapted specially for delivery of the parts to such boxes.

These boxes made of sheet steel are supported in a welded rack. Individual boxes on bench are at comfortable height.

How one user of individual stacking bins employs them to advantage between units in a battery of presses.

Rotating bins used in combination with stationary shelves. Bins of this type can be conveniently used in many places.

HIGHLIGHTS OF MODERN FIBER ROPE CONSTRUCTION

Better means of waterproofing.
Assurance against twisting, kinking and swelling.
Improved means of providing self-lubrication.
Better serviceability and longer life.
Improved core construction.
Improved design of special purpose ropes.

FIBER ROPES

Fiber ropes seldom are used where brute strength is the main requirement, but rather, are selected for controlled pliabilities and elasticities. With these features they are the most adaptable of materials handling devices and undoubtedly have more casual and improvised uses than any other devices, as well as their full shares of the fully engineered uses.

Strengths, pliabilities and elasticities depend upon the materials of which the ropes are made and how they are made. Before the war the material nearly always was hemp. During the war substitutes had to be found. The substitutes did not have the strength of the hemp, but did have quite different gradients of pliabilities and elasticities. There now is considerable reversion to hemp — the rope business is deeply bound by traditions — but in the future, in addition to the use of hemp for those purposes for which it is superior, some of the war born developments of sisals and other fibers may produce ropes of elasticities and of rates of elastic recoveries which will be highly desirable for many applications.

Nylon fiber makes ropes of great strength, high elasticity and such slow elastic recoveries that cables made of it have been extensively used for the airplane towing of gliders. These same qualities could be useful for materials handling applications.

Some of the sisal fiber ropes, while not having the brand new strength of hemp, have higher persistance of strength properties and are likely to be stronger than hemp after long periods of service, especially if the service includes exposure to abrasion or to sharp bending over small sheaves.

The war brought a shortage of rope with consequent increase in the care with which rope was selected, applied and maintained. Such knowledge and habits will persist with the result that for some time to come the useage of rope will be wiser and more economical and profitable.

TYPICAL INDUSTRIAL USES

WIRE ROPE, CHAINS AND SLINGS

During the depression years just before the war the wire rope industry developed preformed rope, improved braided slings, new types of weldless fittings, and various types of grabs and hooks.

None of these had had enough of a prewar market to work out the most thorough knowledge of application engineering. Therefore in the first of the war years application engineering developed very rapidly. It was multiplied greatly by the fact that many of the wartime wire rope users had had no previous experience and had no preconceived false notions about wire rope, and even more by the fact that the armed forces were calling for unheard-of quantities at the very time when the mines and lumber mills and factories and other peacetime users needed more than ever before and everybody, accordingly, had to so apply whatever wire rope he could get as to obtain the greatest possible service from it.

Military services needed large quantities of stainless steel and other high alloy cable and its fittings, and from this market the industry got into position to supply the peacetime market with such products to great advantage.

Special wire ropes, slings and fittings were developed for war time uses. Many of these will remain as peacetime products and will be standardized for commercial uses. The industry followed and is using all of the new developments in steel alloys and other alloys and in forging and casting to provide stronger devices with less bulk and weight and more effectiveness and convenience.

Perhaps the greatest war gain was that more industrial users of wire ropes and slings learned to provide lifting lugs, fair areas for basket slings, better balanced products so slings could handle them to better advantage, fair and strong surfaces on pallets and plates and other objects for grabs to take hold of, and generally better facilities for the profitable use of wire ropes and slings for repair shop work and for production materials handling.

HIGHLIGHTS OF WIRE ROPE, SLINGS AND CHAIN DESIGN

Better forged and heat treated fitting.

Stronger alloy steel cables.

Stainless steel cables and fittings.

Better swaging methods for attaching fittings.

More accurate combination of cables and fittings.

Improved methods of applying fitting without splicing.

Numerous combinations of chain sling and cable sling designs for special applications.

TYPICAL INDUSTRIAL USES OF CHAINS

Slings and other lifting assemblies.

Hoists and chain blocks.

Load binders.

Logging operations.

Wagon and trailer coupling.

Tail gates.

Dredging operations.

TYPICAL INDUSTRIAL USES OF WIRE ROPE

Cranes and hoists.

Elevators.

Slings and lifting assemblies.

Power winches.

Guy wires.

Power shovels.

Draglines and excavators.

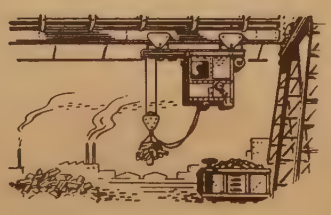
Cableways.

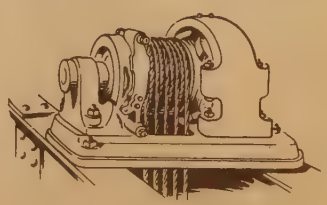
Inclines and haulages.

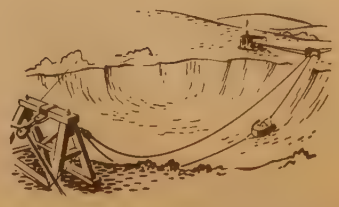
Car pullers and retarders.

Tool suspension.

Automatic reeling devices.







HIGHLIGHTS OF THE MANY DIFFERENT KINDS OF GRABS, GRIPS AND TONGS ARE AS FOLLOWS:

STRIP COIL AND METAL SHEET AND PLATE —
- Toggle arm tongs
- Double chain cam grips
- Four drop-leg grabs
- Cam-operated clamp grips
- Wedge and roller grips
- Screw type plate clamps
- Inverted U grips

PLATE GLASS AND OTHER SMOOTH-FACED MATERIALS —
- Rubber protected grips
- Vacuum cup holders and grips
- Stone slab tongs

INGOTS AND BILLETS —
- Single grip tongs
- Double grab grips

METAL DIES —
- Adjustable jaw tongs

ROLLS (PAPER, ETC.) —
- Tong type
- Curved jaw grabs
- Twin hook rotating grips

BARRELS
- Automatic roll grabs
- Toggle type
- Combination slings
- X type linkage grips
- Roll-over grabs
- Tong assembly grips

BOXES
- Simple pronged hooks
- Two grabbing jaws or hooks
- Self adjusting
- Toggle type
- Width handling grips

SKIDS
- Two double hook jaws
- Inverted U frame grips
- Motor operated grabs

GRABS, GRIPS AND TONGS

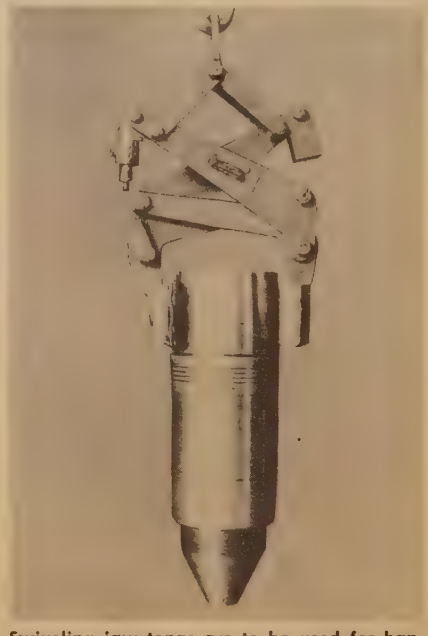
Grabs, grips and tongs perform essential services in many materials handling tasks where goods have to be lifted. They get hold of products firmly so that they can be transported safely and economically.

These gripping devices are usually applied to a crane, monorail hoist, or other like piece of handling equipment. This fact, however, does not prevent them from being used to facilitate manual handling.

Some grips and tongs are distinctly specialized, having application to one type of goods only. Others are quite versatile in the uses to which they may be put. Furthermore, long experience in a given type of handling has resulted in the development of an ideal device for the job.

Portable racks are employed to a large extent for handling pipes, tubes, rods, bars, moldings, etc. Special grabs also come into play for lifting these racks.

These ingot tongs have a grabbing range of from 12 to 26 inches and a lifting capacity of 15,000 pounds.



Swiveling jaw tongs are to be used for handling shells through a shot blasting operation.

The spreading action between the two rings tightens the diamond-mesh sleeve around the cylinder.

This clamp for lifting heavy plates has its gripping mechanism enclosed in the clamp body.

Close-up of a simple tong type roll grab which can be locked in position. Not used for very heavy loads.

INDUSTRIAL SCALES

The tasks that can be performed by industrial scales could roughly be divided into (1) outright weighing of materials (2) counting (3) combination weighing such as proportioning and batching (4) measuring of kinetic energy, such as the horsepower outputs of engines.

In these fields there are thousands of tasks to be performed, many of which require features not ordinarily found in scales. The war developments of scales have included great widening of varieties, features and abilities. More than ever it now is practical to find a scale specially fitted to the operation to be performed instead of modifying the operation to suit the scale.

Scales can do more of the "thinking" and computing, there is less of the "human equation" in their use. Photoelectric devices, printing, activators for automatic controls of processes and for interlocks, more use of alarms and limit devices, make scales become more integral parts of complete mechanisms and substitute full process control for sampling.

Scales are more adaptable. Multi-position heads, multi-position platforms, other parts made to be adjustable as to position, all permit scales to be quickly changed over for various dial reading positions by operators and for handling varied types of loads and batches and other materials problems. Portability, both semi and full, has greatly been increased, many portable scales also having the multi-positional features.

More scales are integral parts of cranes, lift trucks, chain or belt conveyors, other materials handling devices. Special beds and devices on the scales themselves, such as inverted caster wheels for easy sliding of materials, special dump bodies or tanks, increase the adaptability.

The use of scales to measure kinetic energy is moving out of the laboratory and onto the production line. Forces as well as speeds and materials accordingly are being exactly proportioned.

A FEW HIGHLIGHTS IN MODERN SCALE DESIGN

Quick acting and easy reading.

Automatic weighing and recording.

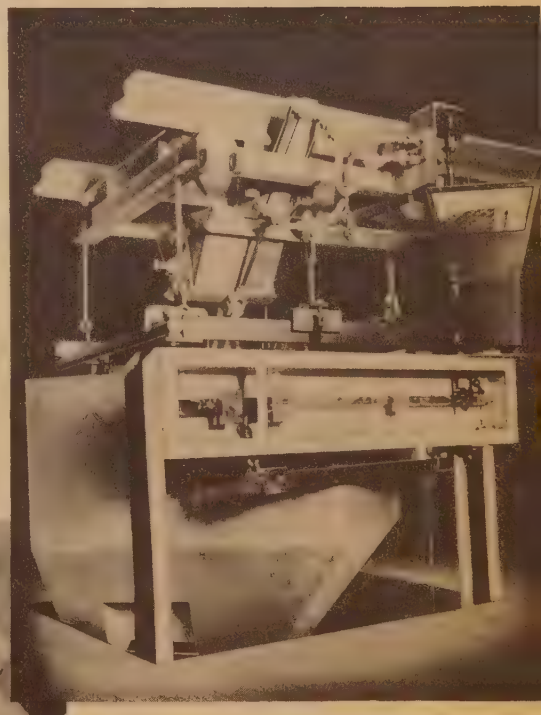
Location of bearing points at extreme outside corners of scale platform, to assure longer accuracy and life.

Increased use of stainless steel construction for corrosive atmospheres.

Use of photoelectric cells for automatic batch and process weighing.

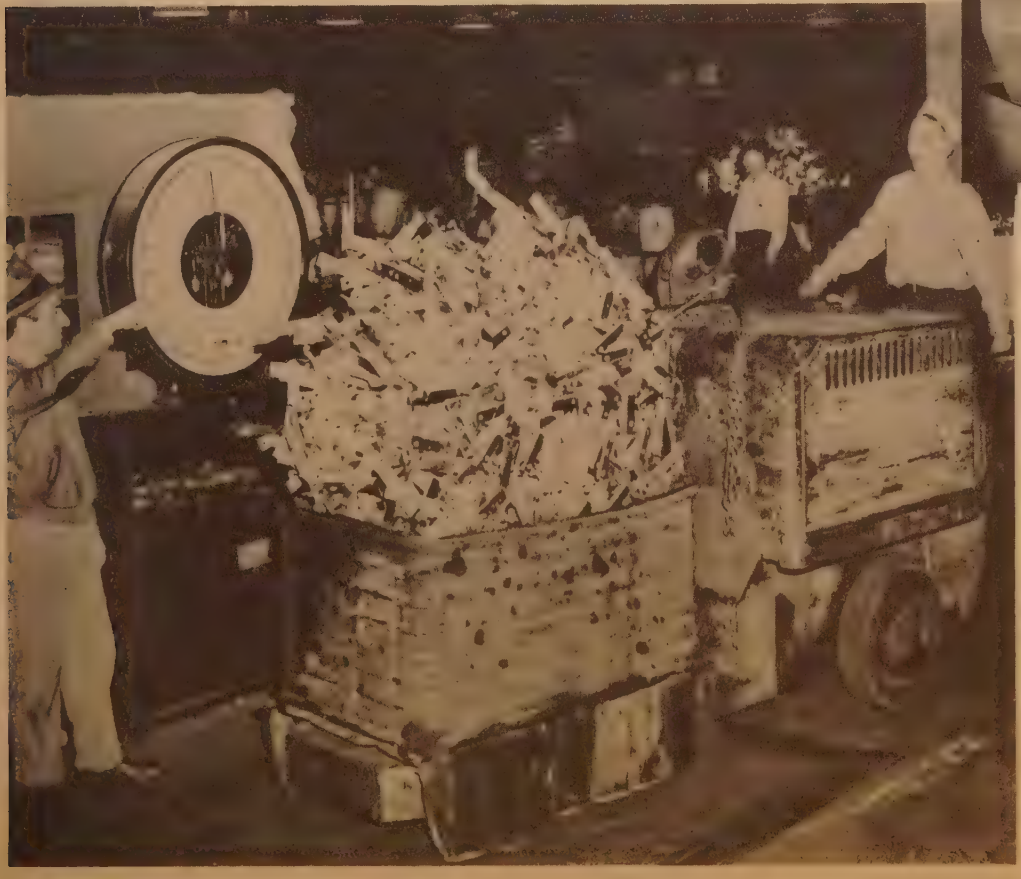
Greater precision in construction and the use of oil-hardened tool steel for bearing and knife edges.

Automatic rejection of wrong weights.



Batch weighing.

Load weighing.



MATERIALS HANDLING CHECK LIST

Checks in the "Yes" column will indicate a need for studying and possibly improving your materials handling methods.

	Yes	No
Are your indirect labor costs high?	☐	☐
Do you have many employe accidents due to the handling of materials?	☐	☐
Is there much manual handling of materials weighing more than 50 lbs. (by male employes), or 25 lbs. (by female employes)?	☐	☐
Do you have many handling jobs requiring 2 or more employes?	☐	☐
Are skilled employes, such as machine operators, required to waste time handling materials to and from their machines?	☐	☐
Are there frequent delays in production time due to poorly scheduled delivery and removal of materials?	☐	☐
Can you make more efficient use of your storage space by mechanical high tiering of stock to the ceiling?	☐	☐
Are your demurrage charges high?	☐	☐
Can you make more efficient use of "unit loads"?	☐	☐
Is much of your material damaged during handling?	☐	☐
Are the maintenance costs on your materials handling equipment continuously rising?	☐	☐
Are there many single handling jobs requiring two or more different types of handling equipment?	☐	☐
Do you load freight cars or trucks by hand?	☐	☐
Do your shop trucks operate more than 20% of the time empty?	☐	☐
Is the major portion of your materials handling equipment over 10 years old?	☐	☐
Do you have many re-handling points along your production lines?	☐	☐
Are you performing too many different kinds of handling operations when fewer would do?	☐	☐
Do your lines of material travel overlap?	☐	☐
Are you using power arrangements when gravity could move the work more economically?	☐	☐
Are you trying to fit mis-fit handling devices to new production jobs just to use up old equipment?	☐	☐
Do you perform a lot of unnecessary handling operations?	☐	☐
Have you been using special devices when standard equipment would suffice?	☐	☐
Can you combine operations to avoid repetitions of materials travel?	☐	☐
Do you try to make one kind of equipment do all kinds of handling jobs?	☐	☐

MAINTENANCE OF INDUSTRIAL CONVEYORS

JANUARY 1947

MILL & FACTORY MAINTENANCE MANUAL No. 17

MAINTENANCE OF

Conveyors of many kinds serve a multitude of materials-handling tasks in the modern industrial plant. In fact, the efficient production of goods today would not be possible without one or more forms of these handling aids.

Practically any sort of materials — bulk or packaged — can be carried by conveyors of one kind or another in capacities required for their economical movement, since capacities depend, to a large extent, on conveyor size and speed.

Goods are moved along conveyors by manual power, by the pull of gravity on them, or by power generated by some mechanical means such as an electric motor, gas engine or other prime mover. Air power, too, may be used as the propelling force.

The nature of the movement may be horizontal, inclined or vertical. And even in a single conveyor installation, the system may elevate and lower goods as well as carry them along a level line.

Transporting media include belts, rollers, wheels, slats, wire mesh, scrapers, flights, chains, screws, buckets, aprons, and overhead track arrangements of various sorts.

FUNDAMENTALS

Most conveyor installations are made up of standard units or sections of one kind or another. Nevertheless, almost every conveying job is "tailor made" to meet the specific problems faced in each mill and factory and in the differing requirements encountered in the different departments in the plant.

It is important, therefore, that the manufacturers of conveyor equipment be consulted in order to obtain the most suitable method or methods and the best possible coordination of all units and accessories needed for the specific materials-handling operations involved.

Among the factors that influence the selection of the right equipment are such considerations as the following: nature, weight, volume of material handled; kind of flow, continuous or intermittent; distances of the various movements; manufacturing methods and processes; sequence of operations; plant equipment layout and floor arrangement; the power requirements and the sources of power available; and the permanence of the installations.

SUPPLEMENTARY INFORMATION

This manual will treat of fixed systems because portable units have been considered in an earlier manual—No. 15 on the "Maintenance of Portable Conveyors and Elevators."

For help in taking good care of drive motors, controls, bearings and hoists, consult the following manuals in the series:

No. 1 — MAINTENANCE OF CHAIN AND ELECTRIC HOISTS
No. 3 — MAINTENANCE OF ELECTRIC MOTORS
No. 6 — MAINTENANCE OF ANTI-FRICTION BEARINGS
No. 12 — MAINTENANCE OF INDUSTRIAL CONTROLS

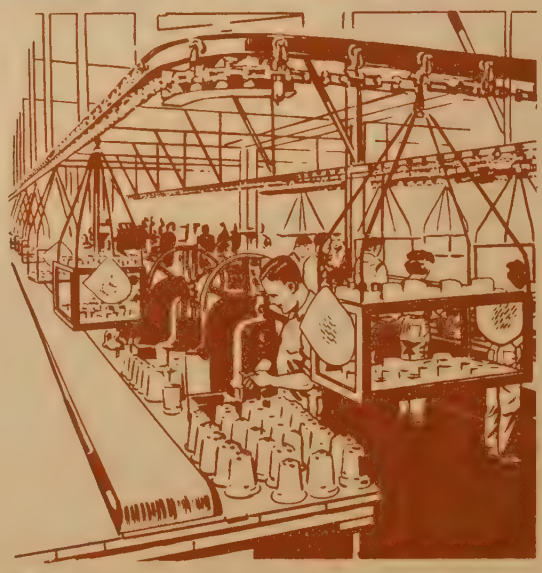
For good practices in maintaining mechanical power transmission equipment found in conveyor installations, refer to the following:

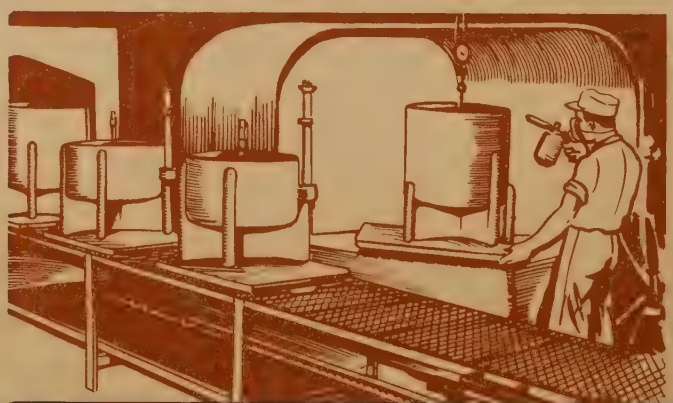
No. 2 — MAINTENANCE OF FLAT AND V RUBBER BELTS
No. 10 — MAINTENANCE OF LEATHER BELTS
No. 13 — MAINTENANCE OF TRANSMISSION CHAINS

THE BIG 4 OF GOOD CONVEYOR MAINTENANCE ARE —

1. INSPECT 2. LUBRICATE 3. SERVICE 4. CLEAN

REGULARLY





TWO "NEVERS" IN LOADING CONVEYORS — NEVER OVERLOAD AND NEVER LOAD CARELESSLY

ROLLER AND WHEEL CONVEYORS

Wheel conveyors roll goods on small wheels which extend above the frame. The wheels revolve in fixed bearings, usually of the anti-friction type; and they are properly spaced for sufficient support on axles that run across the frame or on longitudinal runners along the framework.

Roller conveyors are made up of a succession of rollers so spaced as to provide a continuous, rigid riding surface. The rollers, which turn in fixed bearings commonly of the anti-friction ball or other free-running kind, may be cylindrical or conical or of some other curved shape.

The conveyors may be made up of single rollers extending axially across the frame, or two or more rollers may be mounted on the same shaft. The two- or three-roller constructions are particularly suited for curved sections.

Conveyor rollers are usually set horizontally in their frames. They may, however, be arranged at an angle to form a "V" shaped trough for handling tubular goods.

Switches, frogs, Y sections and turntables are available for changing the direction of travel or routing of the goods carried.

Roller conveyors run either on a level, requiring manual power for moving the goods along them, or they may have a slight grade in order to take advantage of the pull of gravity.

These conveyors may also be power driven. Rotation is transmitted to the rollers in several ways. One method is by means of flat or round belts which press against the under side of the carrier rollers. The pressure is aided by appropriately placed snubbing rollers. In live roller conveyors employing this belt drive, the snubbing or activating rollers should be just high enough to supply sufficient contact between the belt and the carrier rollers to permit them to move the goods.

The care of these belts is similar to that for regular conveyor belts, a subject which is covered later in this manual.

Rollers may also be made "live" by chain and sprocket arrangements. Good maintenance suggestions for the care of conveyor chains are obtained in the Manual No. 13, covering transmission chains.

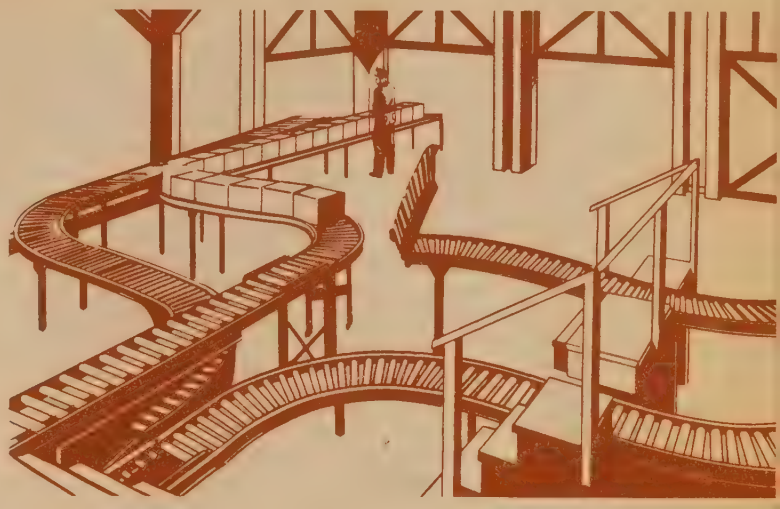
PREVENTIVE MAINTENANCE

Testing the operation of a roller conveyor once a month is usually a sound maintenance practice for the prevention of trouble. This test may be accomplished by running some representative item along the entire line in order that the operation of the rollers may be observed throughout the travel.

Each rolling part should turn easily; and in a gravity system it should revolve several times after the test piece has passed over it. Rollers which do not perform properly should be examined for binding, for mis-alignment and for badly worn bearings.

Dirt and rust cause pinching and binding. If bearings pinch or bind, some manufacturers recommend that the bearings be cleaned and relubricated with oil or grease. On the other hand, other makers advise that their rollers and bearings be run dry. So be sure to follow the manufacturer's recommendations in this respect.

Where anti-friction bearings are grease-sealed, they should be re-greased at regular intervals with a hand pressure grease gun. If steam or water or any other moisture causes are present, the re-greasing is particularly important.



Bearings of the oil impregnated sort which automatically oil themselves during use eventually require re-oiling from time to time. These bearings should also be inspected for wear.

Periodic lubrication will help to prevent interruptions to service.

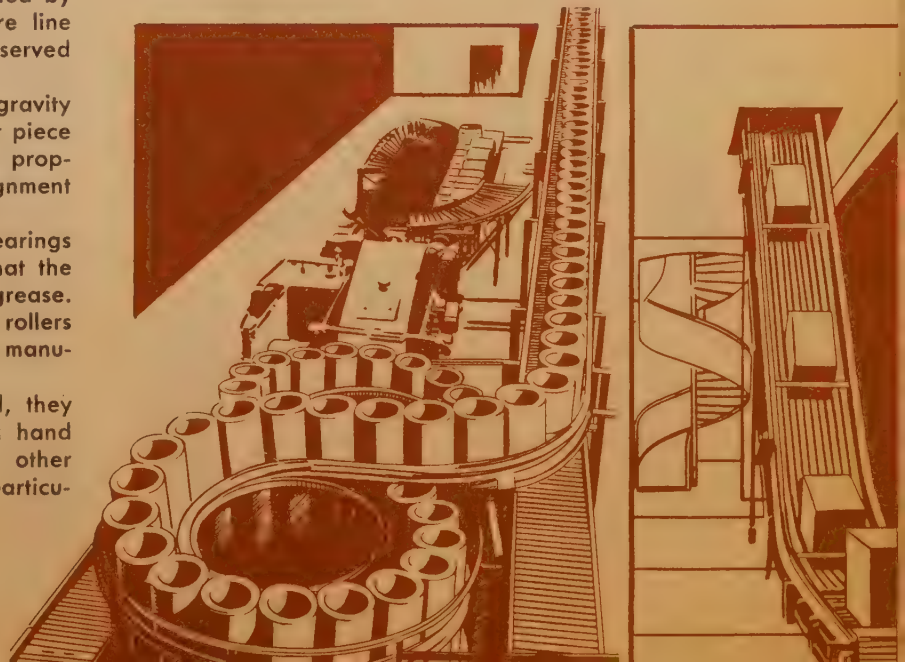
The framework, stands, and roller supports should also be inspected periodically to see that they are firm and that the fasteners are not loose.

CHUTES

Chutes, one form of gravity conveyors, may be straight or spiral. The latter kind is used where the available space is too limited for a straight chute or where delivery immediately below a given point is desired or where control of the speed of the commodity is important.

In maintaining chutes, see that the runways are clean at all times. This check is especially important where dirt may be present or have accumulated on the bottom of the packages or items handled.

Both straight and spiral chutes may have rollered runways, the latter being commonly referred to as roller-spiral conveyors. The rollers should, of course, be inspected periodically for free-rolling. Maintenance procedures for these rollers are the same as those for the usual roller conveyors, which recommendations are given elsewhere.



BELT CONVEYORS

In belt-conveyor systems, materials are carried on moving endless belts which are supported on rollers, pulleys or runways mounted on appropriate supports and framework. The belt is usually driven by a pulley or pulleys which turn in fixed bearings and are mounted on shafts. The drive pulley gets its power from a prime mover transmitted through belts, chains, gears, speed reduction units or other means of power transmission.

Other components of a belt conveyor system include the take-up devices for maintaining belt tension; chutes or hoppers for loading the belt; and chutes, scrapers, plows or tripping devices for unloading. Housings, galleries, decks, or other coverings also are provided when desirable or necessary. A belt cleaning device should be used where sticky materials are handled.

KIND OF BELTS

Rubber belts are widely used in conveyor work. The rubber belts are built up of several plies of cotton fabric bonded together with a rubber compound, over which is laid the rubber cover. A tendency today is to use high grade covers and carcasses possessing high friction with skim coats between the plies. The carcass may also be made up of plies of cords imbedded in rubber. Top covers are supplied with varying degrees of abrasion resistance to meet the many different kinds of materials handled.

Canvas belts are another kind. They consist of layers of cotton duck, in ply or folded construction, sewed together and water-proofed. Belts of balata and wire mesh are also found in conveyor installations.

Belts are operated either flat or troughed. The former are usually used for handling packaged goods while the latter are more suitable for the handling of bulk materials because they reduce spillage and provide greater capacity. On the return part of the travel, however, troughed belts are usually run flat. Troughing of belts is accomplished by inclining the outer rollers.

Manufacturers of conveyor belting and belt-conveyor systems should be consulted for their recommendations in regard to the best kind of belt and its application to meet various service conditions and the requirements of the materials handled.

PROPER INSTALLATION MEANS LESS MAINTENANCE

1. **Use right grade of belt for the expected work and for the specific material handled.**
2. **Be sure that pulleys are large enough.**
3. **Install belts in place carefully.— Do not crease, fold, or strain them in any way.**
4. **Splice belt ends square with the belt.**
5. **Protect belts at loading and transfer points.**
6. **Enclose conveyors wherever practical in order to shelter them from the weather.**
7. **Make sure that the conveyor structure is firm enough to prevent vibration.**

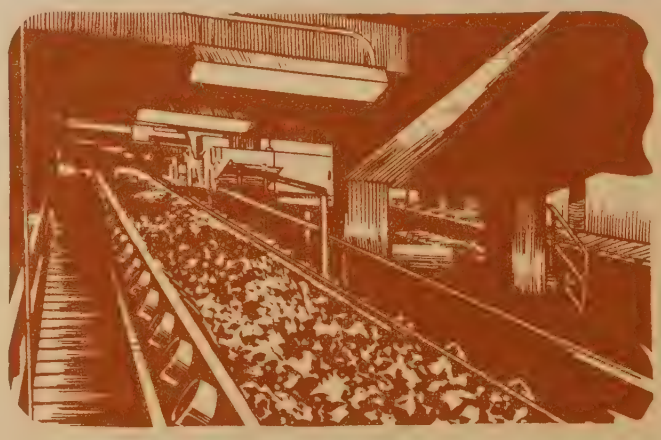
JOINING BELT ENDS

Belt ends can be joined together by means of metal fasteners, such as metal plates with rivets, projecting prongs, or bolts of various kinds.

Vulcanizing is an excellent way of joining the ends of a rubber conveyor belt. Because of the difficulty of installing an endless belt over the pulleys and rollers of a conveyor system, belt ends are seldom spliced and vulcanized at the factory before shipping. Portable vulcanizing presses, however, are available in most parts of the country for joining the belt ends "in place" on the job. These devices are obtainable from the makers of the presses or of the belts.

These manufacturers issue completely detailed instructions on the way to make permanent splices. The instructions, which can be successfully employed by any intelligent mechanic, should be followed carefully.

In brief, the two ends of the belt are cut back ply by ply and matched together for a close fit. They are then thoroughly cleaned and cement applied and allowed to dry. The ends are then fitted together, more cement applied, and the spliced joint put into the press and kept under pressure and heat.



Regardless of the method used to join together the belt ends, it is essential that the joints be perfectly square with the centerline of the belt.

CORRECT BELT TENSION

Proper tension on a belt is maintained by means of screw type take-ups on small installations and by means of suspended counterweights, gravity take-ups or other automatic arrangements where the pulley centers are long.

The tension should be just enough to keep the belt from slipping on the drive pulley.

Too much tension is bad for a belt. It may result from the improper maintenance of rollers, idler pulleys or carriers; excessive tightening of take-up screws; too heavy a take-up pulley; loading of the belt beyond that for which it was calculated; and the shrinkage of the belt from exposure to moisture.

LOADING

Since the principal shock wear on a conveyor belt occurs at the loading point, be sure that the feed chute discharges as gently and as near belt speed as possible.

If the material contains large abrasive lumps, feed

some fines to the belt first to cushion the impact of the large heavy pieces. The notching of the mouth of the chute or the use of a screen chute will permit the finer material to drop on the belt first.

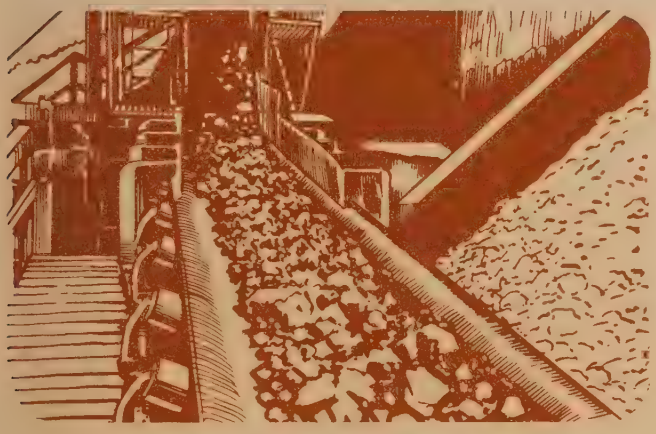
Loading a belt directly over a pulley or carrier roller subjects the belt and the rollers to considerable pounding. Where such loading is necessary, special cushioning devices like impact idlers or carriers are available.

See that proper clearance is maintained between the belt and the bottom and tip of the chute to prevent any scraping contact.

Watch also to see that the material being conveyed does not get wedged between the belt and the chute or other part of the conveyor structure. Trapped lumps can do much damage to the belt.

Protection from trapped lumps may be obtained in several ways. Brushes or scrapers can be used to clean off the belt. Or spillage can be kept off the return side of the belt by installing a decking over the latter.

When skirt boards are used in front of the loading chute, see that they do not come in contact with the belt. Gaps may be closed with rubber strips.



PRACTICES THAT LOWER OPERATING COSTS

1. Inspect equipment as frequently as operating conditions dictate.
2. Keep belt clean, and free from oil and grease.
3. Repair belt wounds immediately.
4. Keep belts and conveyor supports in proper alignment.
5. Maintain satisfactory belt tension by adjusting take-ups as necessary.
6. Watch belt fasteners.
7. Lubricate the carrying, returning, and guide rollers periodically.
8. Take care of driving machinery and power transmission mechanisms.
9. Feed loads on to belt uniformly, carefully and gently.
10. Remove scrap metal pieces from belt by hand or by use of magnets or magnetic pulleys.
11. Prevent spilled material from accumulating on rollers.
12. Operate at speeds that will permit material to ride without vibration or rolling.

MAKING REPAIRS TO BELTS

Belts are specifically designed and constructed for handling various kinds of materials. Nevertheless, belt covers and edges do get cut, chafed and gouged.

Good maintenance practice calls for the immediate repair of any damage because unattended wounds permit dirt and moisture to attack the duck. Furthermore, if the use of a damaged belt is continued, the impact and the sliding passage of injured areas over idlers and pulleys will enlarge the wounds. Regular inspection of belts is therefore necessary.

A satisfactory way to repair this damage is to cut out the damaged spot and vulcanize new rubber into the hole. Here again the repair can best be done with a vulcanizer such as that used for splicing ends. For making repairs in the cover of rubber belts, however, small portable electric vulcanizers can be used. Complete instructions on their use are supplied with the units.

If however, vulcanizing apparatus is not available, repairs to the cover can be made in other ways. There are on the market various filler and patching materials for use in making repairs. These materials include plastic type fillers, repair gum, tire dough, repair fabric, and so forth.

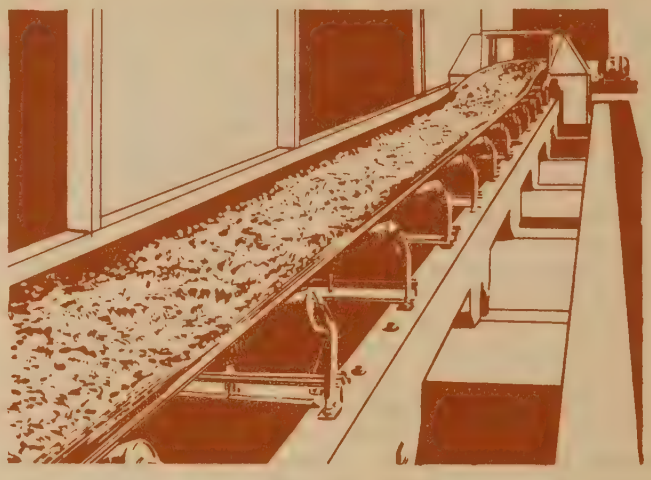
One method is to fill the hole with a plastic tire dough. Another way is to cut a patch from a roll of repair gum and insert it in the hole. In either case the loose material around the edges of and in the wound should be cut away with a knife and the edges evened off. Then be sure to clean out all dirt, using a wire brush where advisable. When clean and dry the wound is filled with the filler or repair gum.

KEEP BELTS RUNNING STRAIGHT

Belts which have been correctly installed on apparatus of good design and which have been kept under proper tension should run straight.

In case a belt does run crooked, the only sound thing to do is to find out the real cause of the trouble. Under no circumstances should one resort to such damaging practices as those of trying to straighten the run of the belt by increasing the tension, adjusting head or tail pulleys when they are already in alignment, or by adjusting unequally the take-up screws or overloading the suspended tension pulley.

MAINTENANCE OF



Guide idlers are sometimes used to adjust new installations or are incorporated where otherwise found necessary. If used, they should be inspected for free rolling and to see that they do not stick and thus wear down the edges of the belt.

In many installations a slight forward tilt to the carriers will help to keep the belt straight. Other remedies are to skew troughing rolls or use self aligning rollers.

Some of the causes for belts running crooked, and the cures, are as follows:

1. Lopsided load — Correct feeder chute or install self-aligning idlers.
2. Misalignment of conveyor —Check conveyor for correct alignment of supports. Sometimes head shaft may not be square with centerline.
3. Faulty carrier idlers—Check idlers for levelness, squareness with conveyor centerline, lack of lubrication, faulty bearing, or freezing. Correct bad condition.
4. Edge worn thin — Cut out worn belt and splice in new section, or put in new belt.
5. Faulty splice — Splice must be square with the centerline of the belt. If renewing or replacing fasteners at joint, square ends again.
6. Insufficient belt contact — If belt is too stiff or too thick, run belt slower to carry more load or use self-aligning idlers.
7. Faulty return idlers — Check shafts for squareness with run of belt, misalignment of supports, or dirty rollers.

ROLLER OR IDLER CARE

Rollers, idler pulleys and belt carriers which are clogged with sand or other foreign matter may fail to turn, thereby causing the belt to rub along the surface.

Inspect the roller carriers and idler pulleys frequently — normally every 30 to 90 days depending upon the service conditions, the conveying requirements, and the lubricants used. See that there is no excessive end play or no unusual wear of, or damage to, rollers, brackets and base. Watch for damaged rollers at feed points.

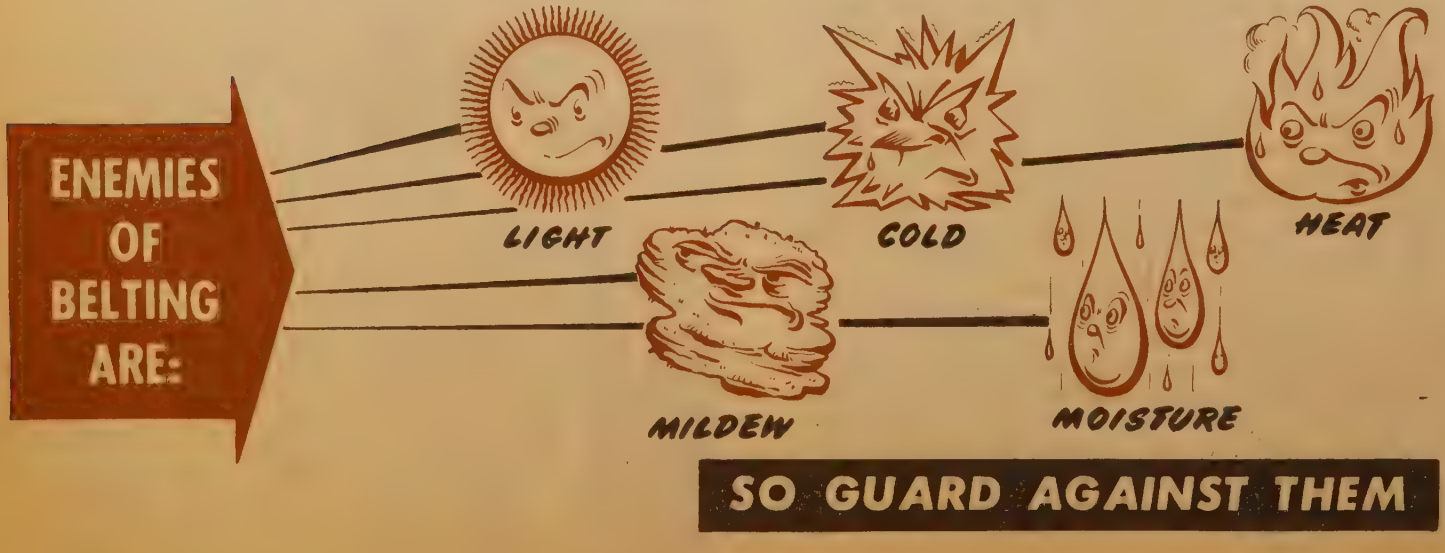
Keep rollers free-moving. Periodic lubrication should be observed, the time schedule depending upon the severity of service, the kind of roller, and the climatic conditions. Lubricate with care because oil and grease are harmful to most belting materials. Excessive lubrication should be guarded against, especially if the bearings are of the anti-friction types.

Clean rollers of any caked dirt and conveyed material accumulations under the rollers.

STORAGE

Attention should be paid to the proper storage of belts. Since heat, light and air promote oxidation of rubber, belts should not be stored near steam pipes, radiators, hot air registers, or windows. Ordinary room temperatures are usually satisfactory, except near the ceiling or roof. An ideal storage place is in a cool, dark cellar, free from moisture, heat in summer and frost in winter.

Spare rubber belts should be left in their original package until ready to be used. Keep rolls upright.



INDUSTRIAL CONVEYORS

OVERHEAD CONVEYOR SYSTEMS

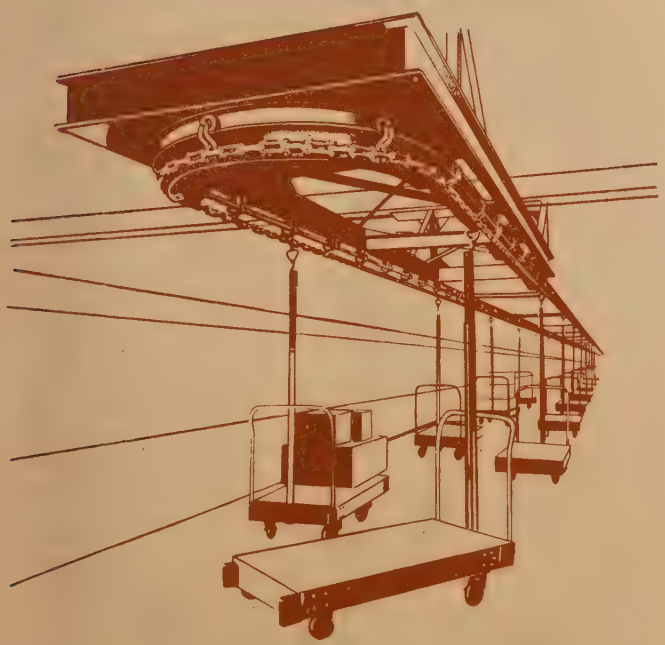
One form of overhead conveyor comprises an elevated rail or track along which run trolleys, connected together in an endless chain arrangement. These trolley systems may either pull loads or carry them in suspension. In the first case, trucks or racks, for instance, are attached to the chain and are pulled along the floor directly beneath the overhead track. In the second case the carriers are suspended from the trolley. The carriers may be hooks, trays, racks, buckets and the like, depending upon the sort of goods or materials being conveyed.

The chain and trolleys are the chief elements of the system. They are the moving parts that require periodic inspection for lubrication and alignment between the chain, track, and the sprockets. Chains and sprockets that are "out of line" are subject to excessive wear. Maintenance Manual No. 13 on transmission chains includes information on conveyor chains as well, and additional data can be obtained therefrom.

The chains, for instance, articulate at the pin bearings and connections and thus require proper lubrication. The trolley bearings should not be neglected either. In some designs automatic lubrications are available.

Sometimes overhead chain conveyors pass through dryers or ovens in which the temperature rises to several hundred degrees. In such installations great care should be shown in providing for proper lubrication. Lubricants for practically any installation — low, normal or high temperature — are available. Lubrication specialists can offer recommendations for the problems presented by any usual or unusual installations.

Guards, either stationary or attached to the conveyor, should be used where dirt or grease might fall on the products being conveyed. Similar protection should be accorded conveyors when they pass through spray booths, since paint and water are detrimental to good operation.



TRAMRAIL AND MONORAIL CONVEYORS

Another similar form of overhead materials handling equipment is that in which the elevated monorail or tramrail system carries hand-chain or electric hoists. The trolley-hoists are moved manually or by electric operation, instead of being driven by endless chains. These systems are commonly classed as overhead hoists and cranes; nevertheless they do perform considerable conveying duties as well in many applications.

In regard to the hoisting equipment involved, complete instructions on the care and "Maintenance of Chain and Electric Hoists" are given in Manual No. 1.

One convenient inspection schedule for overhead rail conveyors, excluding the items which have been covered in the other Mill & Factory manuals referred to, is as follows:

INSPECTION SCHEDULE

ONCE A MONTH

Trolleys — Inspect for lack of, or excessive, lubrication. Check wheels for wear.

Cross-Overs, Switches, etc. — Check for correct alignment and clearances.

Oil and Grease Fittings — Add lubricant as required.

EVERY THREE MONTHS

Roller Chain Drives — Check for tightness and alignment.

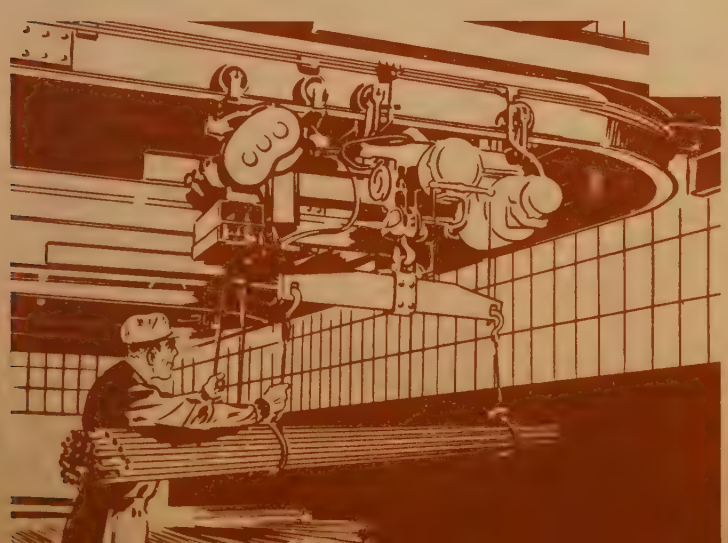
Running Gear — Inspect shafts and couplings for loose bolts and screws. Lubricate.

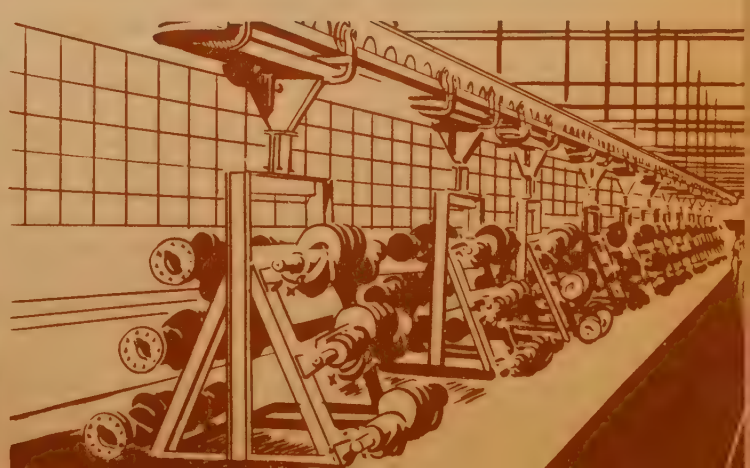
Trolley Wheel Bearings — Check and lubricate.

Runways — Check supports and hangers for loose bolts, nuts and other fasteners.
Examine track for wear.

EVERY SIX MONTHS

Entire Equipment — Clean thoroughly, removing accumulated dirt and debris. Clean rusty spots, and paint.





PNEUMATIC CONVEYORS

One kind of pneumatic conveyor is a tube system in which air power propels a cylindrical or oval-shaped container that fits tightly in the tube. This method is used primarily for the movement of factory orders, job and time tickets, requisitions, drawings, and small tools and parts.

Pneumatic tube installations may be either suction or pressure type, or a combination of both. In addition to the tubing, principal parts are the power unit, and the dispatching and receiving terminals.

Another form of pneumatic conveyor is that which moves bulk goods by suction or pressure. The materials must be loose, fine, and granular and not very dense — such as cement, grain, and other dry pulverized products, even crushed coal.

In the suction type, a partial vacuum created by an exhauster or blower generates an air velocity which draws the air and material through the intake nozzle and conveyor hose line and conveys them to the discharge.

In the pressure type, air pressure rather than a vacuum is the moving agent. The pressure may come from the exhaust side of a blower, for example.

In another variation, the pressure pump system, the material is drawn into the pump and advanced by an impeller screw. Just beyond the pump screw section, air is injected. The air expands the material, making it fluid so that it can be moved through the conveyor line by mechanical power.

The essential parts of a pneumatic installation which are subject to inspection and maintenance attention are exhausters, blowers, receivers, filters, air locks, separators, valves, hose, duct, compressors, vacuum pumps, and so forth.

CONTINUOUS FLOW CONVEYORS

Another continuous carrier is the flight conveyor for the en masse movement of pulverized, granular, small lump, or flaky products.

The flights, which travel in an enclosed casing, may be flat, peaked, or skeleton "U" in shape and are linked together by chain or rod sections.

Essential parts of these conveyors are the flights, scrapers, chain belts or links, locking pins, drive sprockets, tail wheels, inspection doors, feeding devices and discharge arrangements. They require maintenance also.

BUCKET ELEVATORS

Endless belts or chains to which buckets are attached are used for conveying bulk materials in a vertical or other steeply inclined direction. The buckets may be spaced or set continuously.

The maintenance of these elevators is generally the same as for the corresponding conveyors.

Materials used in the construction of elevator belts, for instance, are the same as in conveyor belts, except that the former usually have more plies than conveyor belts of the same width.

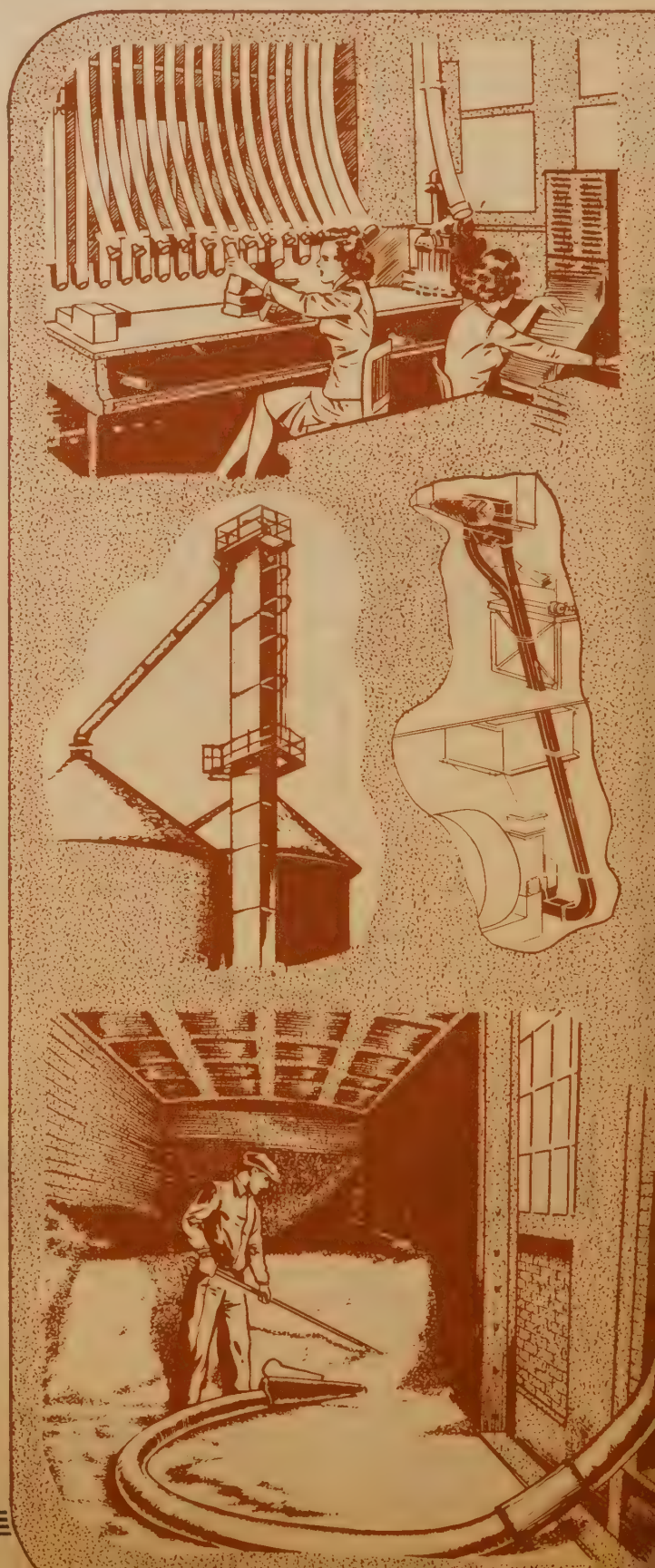
Because of the buckets and the housing, crooked running of elevator belts, one cause of which is uneven loads, can be damaging. If feeding is by spout, therefore, check the feed to see that it centers on the buckets.

Loosening of bucket bolts can be troublesome; so inspect the bucket connections periodically.

Material spilled between the belt and the boot pulley, too, can be harmful.

Maintaining the proper tension is very important in belt elevators as it is in belt conveyors.

As in all preventive maintenance, constant vigilance pays off with low-cost conveying operations. So inspect elevators at least once a week. Check all joints and clearances. Tighten loose bolts and replace worn buckets and fasteners.



Keep a complete set of these useful Maintenance Manuals in your file. Reprints may be obtained by sending 10c each to MILL & FACTORY, 205 East 42nd St., New York 17, N. Y. Special permanent binders will be supplied for $1.50 extra.

A Case Study in the Development and Installation of a Job Evaluation Plan

BRIEFED: This article, the last of a series of articles on Job Evaluation, explains a practical application of the principles and techniques developed and presented by the writer in three previous articles.

By Merle D. Schmid
Chief Industrial Engineer
Industrial Management Engineers

PART V

THE case chosen for study was a job evaluation program installed in a medium size midwestern machine and forge shop. This company, referred to in this article as "The Blank Machine & Forge Co.," was slightly more progressive than the average company of its size. Approximately 400 people, in addition to the supervisory staff, were employed on 179 jobs.

The plant was originally a job shop employing skilled workers. During a period of about three years prior to the job evaluation program, both job shop and production work was done. A number of the semi-skilled workers on production jobs were on piece-rates and, in some cases, because of badly set rates, these new people were earning as much or more than the machinist who had been with the company for many years.

The Blank Machine & Forge Co. had had a normal background of employe relations. In a period of ten years a national union had organized the plant, opposed the management vigorously, called a strike, won maintenance of membership, become less radical, assumed some responsibility, and developed into a reasonable bargaining agency with which the management of the company was able to cooperate.

As an over-all picture, union-management relations were very good at the time the job evaluation program was started. During the progress of the evaluation work, both sides showed their willingness to get to the facts and develop a workable solution to each problem as it arose.

The first step in the development of the job evaluation plan at The Blank Machine & Forge Co., was the selecting of a committee to do the actual work. This committee consisted of a consulting engineer, three members from the management and three people representing the union. The three management members of the committee consisted of the plant industrial engineer and two operating foremen of high calibre. The three union members were elected by the union membership and were paid by the company during the period of the evaluation on the basis of their usual jobs in the plant.

Clearing Committee

A sub-commitee consisting of the consulting engineer, the industrial engineer from the plant, and one of the union members, developed most of the procedures and acted as a clearing committee during the entire evaluation program.

THE BLANK MACHINE & FORGE CO.

SUMMARY OF JOB EVALUATION PLAN

PRINCIPAL FACTORS AND ELEMENTS	Table No.	Maximum Points	
I. Job Prerequisites			
A. Mental Development	1	30	
B. Pre-Job Experience	2	50	
C. Skill	3	60	
			140
II. Job Deterrents			
A. Working Conditions			
1. Surroundings	4	35	
2. Hazards	5	25	
B. Effort			
1. Mental Exertion	6	30	
2. Physical Exertion	7	40	
			130
III. Job Responsibility For:			
A. Safety of Others	8	20	
B. Materials	9	30	
C. Tools, Equipment & Delay	10	50	
D. Maintenance of Production	11	30	
			130
	Total - - - - -		400

Figure No. 1

The actual work of developing and installing the job evaluation program at the Blank Machine & Forge Co., involved several separate and distinct phases of work. These different phases of the program were developed simultaneously in such a manner as to integrate properly with the program as a whole. That phase of the program which required the most man hours and the greatest amount of detail was the making of the job analysis and job descriptions for each job in the company.

During the first week of the job evaluation program, the three member sub-committee developed the procedure for the job analyses and forms on which the job descriptions were to be recorded. As soon as this was done, the other members of the committee began working on the evaluation program, and the committee as a whole reviewed and modified the job analysis and job description procedures.

In this analysis by the committee, consideration was taken of the different items required in the job analysis and descriptions in order to have a firm basis for the balance of the evaluation program.

It was recognized that it was of particular importance to have complete job descriptions prepared in sufficient detail to provide a factual basis for evaluation of each factor. Considerable thought and work was put into this phase of the program. The type of job analysis developed and the job description form used to record this information included the six essential parts as follows:

1. *Summary of Duties*—A statement describing the chief purpose of the job. This statement was worded in a manner to convey the reason for the job and at the same time differentiate between it and other jobs.
2. *Source of Supervision* — A Statement that in addition to telling who supervised the job, explained how that supervision was accomplished. Often a job received partial or "functional" supervision and direction from several sources. This was stated and explained.
3. *Supervision Exercised* — A statement that described who was supervised by the job and the type and extent of the supervision or direction.
4. *Equipment Used*—A list of the machinery, machine tools or production equipment operated or used on the job.
5. *Tools Used*—A list of all hand tools and miscellaneous supplies used on the job.
6. *Working Procedure*—The general style used in this detailed part of the job description consisted of statements of each duty starting with a verb of action such as: "secures," "copies," "measures." Broad terms such as "handles," "supervises," or "prepares" were not used unless they were further defined.
   When it was possible the working procedure was written in "story" or "history" form; that is, the work cycle described in exactly the same sequence as it happened on the job.
   The work procedure on some jobs could not be readily described in sequence without becoming involved in long complicated sentences and undecipherable paragraphs. When this was the case a list of the duties performed with sufficient information as to the "how, what, when and where" of each duty to indicate its complexity and difficulty was used.

By the end of the first week of the job evaluation program the procedure for job analysis and job descriptions had been established. All members of the job evaluation committee, besides the three people who acted as the development sub-committee, began working on the actual job analysis and descriptions for each job in the plant.

At this time the three man development sub-committee started working on other phases of the job evaluation program. By such a procedure the collection of information in the

form of job analyses and job descriptions progressed simultaneously with the development of the other phases in the evaluation program. These additional phases of the program worked out by the three man development sub-committee were:

1. Development of specific job evaluation factors
2. Selection of bench mark jobs
3. Weighting of factors
4. Ranking of bench mark jobs

The general type of procedure used for these steps has already been discussed in the previous articles in MILL & FACTORY by the writer. In the selection and development of the specific factors and guide charts to measure these factors for The Blank Machine & Forge Co., consideration was taken of the influences affecting the value of each factor. The factors developed for the job evaluation plan to apply at The Blank Machine & Forge Co. and the relative weightings of these factors are shown in Figure No. 1.

It was determined that the factors, Strength, Social Skill and Responsibility For The Work Of Others, had no significant effect upon the wage structure of The Blank Machine & Forge Co., and, therefore, these factors were omitted from the evaluation plan. It was also found to be advisable to combine the two factors for Surroundings and Health Hazards, as well as to combine the factors of Responsibility For Tools & Equipment, and Responsibility For Avoidance of Delay, since within the scope of the jobs covered by the evaluation program, similar attributes were measured in each case. If the factors had been left separate, it would have only complicated the evaluation plan without increasing accuracy.

Development of Guide Charts

Tables No. 1 through No. 11 are the guide charts developed to be used with this job evaluation plan. The relative point rating for each factor was determined by the techniques described by the author in a previous article. The wording of each step in the scales within each guide chart was developed to show distinguishable differentials in the attributes being measured. In many cases two or more similar or somewhat parallel attributes were combined into one scale. For example, in Table No. 7 for the factor of "Physical Exertion," the vertical scale was designed to measure both the strength required and the effect of surroundings and working position on the fatigue resulting from the use of this strength. In the horizontal scale on this guide chart, the pace of work was measured in such a way as to include consideration of both continuity and the speed of the job.

Eleven guide charts were designed to measure those factors which were determined to have a recognizable influence on the wage pattern at The Blank Machine & Forge Co. These guide charts summarize, and in fact are, the job evaluation plan used for this company.

A sample job description for a machinist is shown in Figure No. 2 and the corresponding job evaluation is shown in Figure No. 3. Job description and job evaluation forms of this nature were filled out for each of the 179 jobs at The Blank Machine & Forge Co.

After the job descriptions were complete, the factors established and weighted, and the bench mark jobs evaluated, the evaluation of each job was done individually by various of the committee members. This first evaluation was checked by cross-comparison, factor at a time, with all other similar jobs. If the cross-comparison procedure showed inequities these were reconsidered and then the evaluation committee as a whole agreed upon the evaluation of each job.

The point rating for each job was translated into a wage rate per hour by the technique discussed by the author in a previous article.

After the job evaluation plan was developed and each job in the plant evaluated, policy was established as

JOB DESCRIPTION

THE BLANK MACHINE & FORGE CO. CENTERVILLE, U.S.A.	PRESENT TITLE: Machinist Class "A" DESCRIPTIVE TITLE: Millwright Leader

SUMMARY OF DUTIES

Lays out and performs any type of job on machinery required by the shop. Assembles, erects, repairs, or dismantles equipment in the hot or cold shops or on the machine shop floor.

SOURCE OF SUPERVISION	SUPERVISION EXERCISED
Receives direct supervision from Machine Shop Foreman. Is directed by Hot shop or Cold shop foreman when working on equipment in those shops.	Directly supervises helper, may lead and direct crew of 2 to 6 men including millwrights and laborers depending upon size and complexity of job.
EQUIPMENT USED	**TOOLS USED**
Boring Mill Engine lathe Drill press Shaper Milling machine	Micrometer Vernier calipers Calipers and dividers File, chisel, wrenches, etc.

WORKING PROCEDURE

Receives instructions from the foreman concerning the requirements of the job. Plans job to determine tools, equipment, materials, working procedure, etc. Procures tools needed from tool room. Performs the work required which varies considerably but in general, is of the following nature: Oversees and actively engages in assembling, erecting, dismantling, repairing, and machining such equipment as the following: Automatic hot bolt heading machines, horizontal forging machines, hammer header machines, hot nut forging machines, bolt trimming, pointing, and threading machines, nut burring and tapping machines; and miscellaneous other equipment including overhead cranes, conveyors and handling equipment.

To perform these functions, it is necessary to be able to: Measure up a job, lay out work, plan procedure, read blueprints, figure size and kind of materials and equipment needed for specific work. Make shop calculations; make sketches; align and assemble machinery; go into any part of the plant and assemble, erect, dismantle or repair all types of equipment whether on floor, overhead, etc. Machine material or parts to accurate tolerances on any machine tools.

Figure No. 2

JOB EVALUATION

The Blank Machine & Forge Co.
Centerville, U.S.A.

Job Title-Machinist "A"
Department-Machine

	JOB FACTORS	BASIS OF RATING	CODING	POINTS
JOB PREREQUISITES	Mental Development	Interpret blueprints and sketches. Instruct and explain methods of work to helper.	3-E	13
	Pre-Job Experience	Must serve apprenticeship, have all around practical knowledge and thorough mastery of details.	5-48	40
	Skill	Use judgment and initiative to lay out order of work. Use tradesmen's hand tools on jobs requiring close coordination to maintain tolerances.	D-Z	48
JOB DETERRENTS	Surroundings	Fumes, dust and minor accumulative effects from gas. Dirt and occasional wetness Glare from furnace, noise from steam hammer.	4-C-X 2-B-Y 2-B-Z	5 2 1
	Hazard	Struck by dropped tool or material.	B-X	3
	Mental Exertion	Plan layout and schedule work; instruct helper, and perform close tolerance work for maintenance.	C-Z	20
	Physical Exertion	Work with machinist's tools and maintenance material in cramped position.	C-W	9
JOB RESPONSIBILITIES	Safety of Others	Strike others with tools or materials.	2-A-X	2
	Materials	Fail to hold tolerance causing scrapping of material.	B-T-100	8
	Tools, Equipment & Delay	Damage machine tools by improper set-up or handling of material.	B-F-W	6
	Production	Definite control of work pace for self and helper.	D-F-W	8
Date 1/13/46	Described by J.C.R.	Evaluated By M.D.S.	Approved A.C.Brown B.J.Smith A.M. Jones	Total Points 166

Figure No. 3

to the methods to be used in the installation of this job evaluation program. This step in the evaluation program at The Blank Machine & Forge Co., was analyzed and discussed in great detail and the final policies established were the result of the influence of both management and labor's viewpoint. Essentially, the policies agreed upon and used in the installation of the job evaluation plan were as follows:

1. The wage rate range was divided into classification steps of 3c per hour in the lower brackets, and 4c per hour in the higher brackets.
2. All adjustments in rate were made retroactive to the date that the job evaluation program was started.
3. All jobs shown by the evaluation program to be underpaid were raised to the evaluated rate.
4. The rate on jobs that were shown to be overpaid was changed to the new evaluated rate and all new employes on a job received this rate. However, old employes on the job were guaranteed their original earnings.

Simple Plan

The job evaluation plan developed and installed at The Blank Machine & Forge Co. was constructed in such a way as to provide a reasonably accurate device for measuring the value of jobs and still leave a plan simple enough to be easily understood and administered.

The writer prefers to think of this plan as a compromise between *detailed accuracy* and *understandable simplicity*. The schematic diagram shown in Figure No. 4 indicates this viewpoint. When a plan is accurate it tends to be complex, and difficult to explain and administer; whereas, when a plan is simple it tends to be inaccurate, and adds to the inequities it is supposed to eliminate. The proper plan for a certain installation is a compromise between these conditions. The evaluation program presented in this article is such a plan.

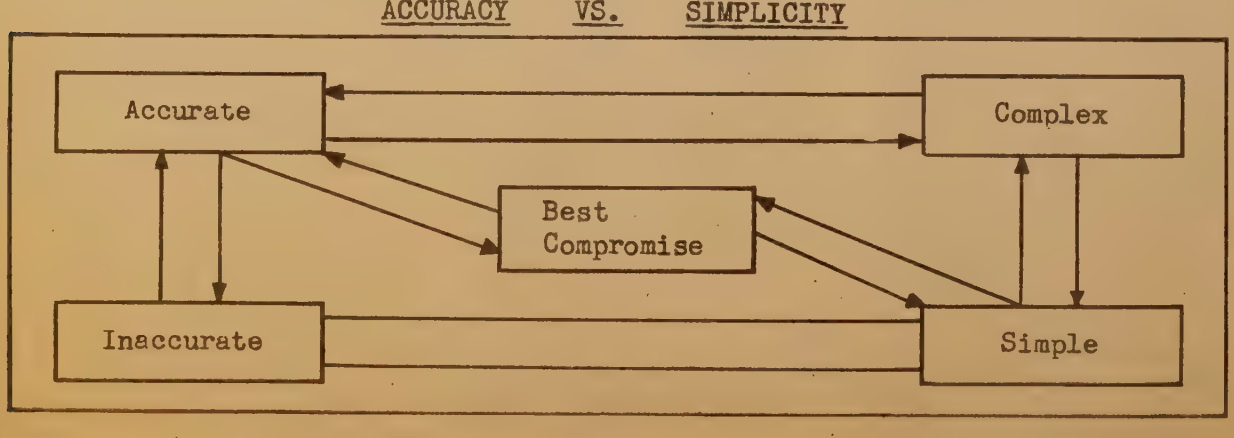


Figure No. 4

The Foreman's Part in COST CONTROL

By Bert V. Tornborgh, C.P.A.

PART VII

UP to this point, in parts one through six, inclusive, we have dwelt upon concepts and definitions of costs, the components and elements, and the cost factors affecting various phases of shop routine and administration. The techniques of recording and routing cost data have been explained and illustrated; the principal costing methods have been described, and the shop routine under each has been outlined.

We are now ready to consider the principal purpose of having a cost system, namely cost control, and how it is achieved.

From the accounting office point of view, the approach to cost control lies in analysis of statements and reports, fact-finding and digesting of various cost data. However, as far as the shop man is concerned, there are several distinct points at which factory management can exercise direct and most effective cost control.

The three main points are: job evaluation, the work of the foreman, and rate-setting. Together these three furnish the most powerful and practical force for cost control.

The Foreman's Qualifications

In order to be in a position to correctly appraise the foreman's important contribution to cost control today it is desirable, almost necessary, to know what type of man carries this and other responsibilities on the vital factory floor. A check list of his makeup might include:

1) Knowledge of *every* operating detail in his section.
2) Ability to do a job as well as, or better than, any employe working under him.
3) Aptitude in carrying out management's decisions and policies.
4) Tact and strict, but cordial, impartiality toward employes.
5) Understanding of what is behind the decisions and policies of management.
6) Analytical open-mindedness on employe grievances.
7) Fairness in job-rating and rate-setting.
8) "Know-how" of maintaining an uninterrupted flow of materials.
9) Sustained pace-setting — however, no whip cracking
10) Capacity for arranging the most efficient bench and machine layouts.
11) The courage to make decisions and to stand by them.
12) No favoritism.
13) Practical knowledge of federal, state and local labor law provisions.
14) Familiarity with union procedures, agreements, representation, etc.
15) Ability to judge quality of output.
16) Patience and skill in employe training.
17 Understanding of pay methods, pay deductions, pay computations, bonus plans, etc.
18) Cost-consciousness.

It is that last point that is most vital here. All the conclusions drawn from compilations of figures in the accounting office will not help one iota as long as the man in the shop does not give his full co-operation and is not fully cost-conscious.

Cost Reports for Foremen

The most efficient way in which a foreman is able to judge how efficient his department has been during a given time period is by reading the cost report pertaining to his particular department. Consequently, the age-old notion that these cost reports are "confidential" is being discarded in progressive organizations, which recognize that the preparation of such data involve far too much time, money, and effort to lock up the results in files. The fact of the matter is that the continued preparation of cost statements can only be justified if they are put to positive usefulness in an intelligent scheme of cost control. If not, they had better be discontinued.

In answer to the objection that competitors might obtain access to the so-called "confidential" cost data, one can only answer that if there is no trust the boss should get himself another foreman, or the foreman should get himself another boss. And *if* a competitor does find out that your machine-hour rate of depreciation on a turret lathe is x cents against his y cents—is it really that important?

It is one thing for the office to plan better standards, but quite another to achieve better standards on the floor of the shop. In most cases foremen would be only too glad to help if they were kept informed of the cost facts that concern their department.

The most important statement to the foreman is the cost of production report, which shows, for each section, cost center and department, the direct material, direct labor and overhead costs for a given period. (See Figure 17). In addition, the quantities produced may also be shown. The foreman can then understand, and will take an interest in, that particular report, because it pertains to his own department; he can take pride in a good showing, be spurred to extra effort when the results are not satisfactory. He gets the feeling that nothing is being withheld from him.

Defective work reports, showing an analysis of the attendant costs, are sometimes prepared by foremen, other times furnished to them

from other sources. An example of one in the former class is shown in Figure 13. This report automatically calls for the most rigid superintendence over quality standard and maintenance, so as to keep the cost of defective work down to an irreducible minimum.

Material and labor reports, showing budget allowances in comparison with actual costs, are sometimes furnished to the foreman. However, if a good job had been done on setting the standard originally, the chances are very likely that almost no variation would occur. Controllable overhead, on the other hand, is something over which the foreman can exercise sound management and he should be furnished with frequent, detailed reports on the status of his section or department. Dollar amounts for each overhead item should be shown together with percentages. Quite often a special bonus plan is in effect, awarding to foremen the saving in actual controllable overhead expenses below certain predetermined budget allowances. These bonuses are generally calculated over an extended period of time, so that the averages may be absorbed in favorable periods. Payment is generally made semi-annually or annually.

Idle machine reports and idle labor reports are other statements which are of significant concern to the foremen. Whether the cause be lack of material, faulty planning, or need for repairs and maintenance, it is management's responsibility, not the worker's—and management begins, and sometimes ends, with the foreman.

Reports on repair costs are of direct interest to the foreman and these should show comparisons with one or several preceding months and also an average month.

Where a standard cost system is in effect, the foreman should be supplied with a variance analysis reflecting his department's costs, such as illustrated in Figure 14.

Miscellaneous reports and statements may be introduced, from time to time, as circumstances suggest. A prime rule is to have them as uniform as possible, as understandable as possible, and as short as possible. Simple pie charts, bar charts, or curves often meet these requirements better than figures in columnar form, and are conceded to have "visual" advantages over tabulations, although sometimes precision is sacrificed.

TYPICAL COST OF PRODUCTION REPORT

A-1 MACHINE WORKS

WEEKLY COST OF PRODUCTION REPORT

Dept.- #12 Turret Lathe Foreman.- J. Jones

Week Ending- January 11, 1947

Item of cost	(A) Budget	(B) Actual	Excess of (A)over(B)	Excess of (B)over(A)
Direct Materials				
Direct Labor				
Overhead:				
Indirect Materials				
Indirect Labor				
Supplies				
Tools				
Maint. Materials				
Maint. Labor				
Power				
Other Items				
TOTALS				
Net Gain(Net Excess of (A) over (B)				
Net Loss(Net Excess of (B) over (A)				

Fig. 17

Incentives for Foremen

The performance of foremen, and through them the effectiveness of the employes in their charge, is usually the most important single cost factor in a plant. It follows that incentive plans for foremen are a powerful instrument in control of costs.

In computing a foreman's wage bonus consideration should be given to the following factors:

1) Weighted bases for attendance, for idle time, for turnover, for scrap and waste ratio, for defective work, inspection ratings, unit costs.
2) Incidence of accidents.
3) Percentage of section's labor costs to total departmental labor costs.
4) Teamwork in setting up jobs, getting production underway, meeting standards of quality and quantity.
5) Accomplishments in training new employes.
6) Co-operation with others.

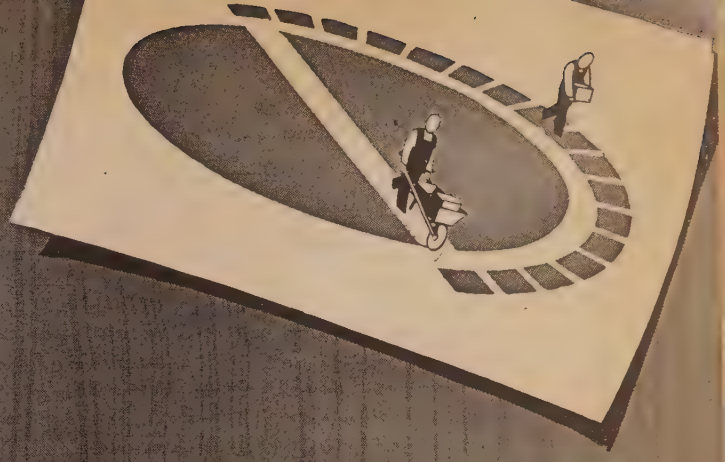
Although quantity output is important, quality should not be overlooked. "Quantity" has proved harmful in many plants in that it tends to stimulate cutthroat competition, rather than co-operation, between departments.

Tangible factors—such as quantity, quality, cost, and turnover—are measurable; but intangible performance characteristics are rated. With this thought in mind it becomes rather difficult to design an analysis sheet for a foreman's job. Consequently, the task has to be approached with some forethought, and where the job lends itself to some degree of standardization the task is facilitated. Measurable factors should be given the preponderance of weight, perhaps 75% or more, and ratable factors should remain secondary.

A particular bonus plan might be reduced to consideration of these three factors: 1) cost reduction; 2) output; 3) some point by point award for improvement in rating on intangible factors.

Cost reduction, naturally, is measurable on various scores as outlined previously and output should be judged against both quantity and quality standards, with consideration of connected factors. The bonus, in almost all cases, would be expressed as a percentage of the foreman's base wage.

PRACTICAL Short Cuts and Kinks



Production-speeding ideas and methods, and workable suggestions that save time, toil, materials, and money — Contributed by employes, companies, and government agencies.

Pallets For More Speed and Accuracy

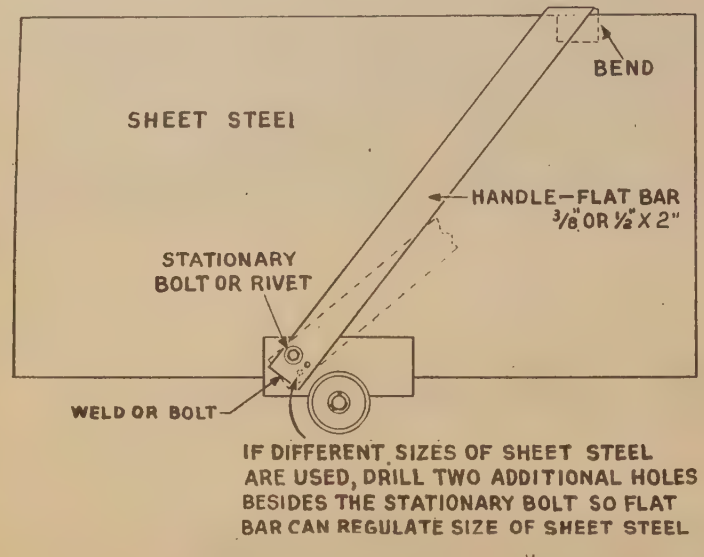
The use of small pallet issue boxes in connection with standard-size pallets has enabled the storage, issue and shipment of needed materials to be accomplished with the greatest amount of speed and accuracy.

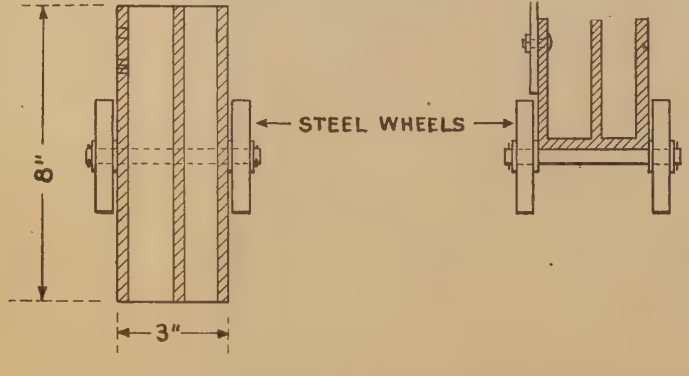
These boxes, 4′ x 4′ x 18″ deep, are sturdily constructed. They are divided into several small and large compartments in order to accommodate materials of various sizes. The section partitions are removable, thus providing a container of great flexibility. It is worthy of note that the permanent usefulness of the unit as a full-size box is not impaired, and that the box itself, which is nailed to the pallet, may be removed when desired.

To add to the efficiency of the arrangement, each section contains an invoice pocket made of wood or fibre board for receiving the invoice or stub that must accompany the issued material.

This suggestion, which was submitted by Samuel Prescott, Storekeeper, Naval Supply Depot, Newport, under the Navy Employes' Suggestion Program, makes possible the orderly handling of materials of various sizes, thus making very substantial savings in time, labor and money.

PRACTICAL SHORT CUTS AND KINKS





TRUCK FOR HANDLING SHEET STEEL

Maybe you have some heavy plates or sheets of steel to be moved to a waiting truck, or to be piled in another location. Maybe the crane or hoist is being used on another project, which situation means that the work must be man-handled and carried some distance.

A handy little truck, which can be controlled by one or two men, can be made up from an 8" long piece of channel bar, 3" wide with an additional piece of steel welded between the inner side of the channel so as to allow handling of small number of sheets, one or more at a time.

Place an axle on the truck, attach two 4" wheels and pin them with cotter pins after placing a large washer on either side. The handle of the truck can be made up of 3/8" or 1/2" x 2" flat bars, the length of which will depend upon what you may have in mind to handle. If desired, it can be made adjustable to several sizes by the drilling of additional holes.

This was suggested by William H. Mullen of Quincy, Mass.

DOING A 4-DAY JOB IN 2 DAYS

The moving of nine hundred lubrication oil barrels from one location to another at the New London Submarine Base would take four days to perform. It became necessary to do this job more quickly.

Since the number of cranes and other hoisting and transporting equipment was limited, it was apparent that the only thing to do was to increase the capacity of the existing apparatus. Holger Eiriksson, an employe of the Supply Department, came up with the design of a device which easily picks up and carries safely two or more flanged type oil drums. He submitted the idea under the Navy Employes' Suggestion Program.

This rig is very simple and costs little to make. It is also easy and quick to operate and virtually fool-proof since it is impossible for the hooks to release their load as long as there is a lifting strain upon them. Through the use of this rig, it was possible to finish the drum-moving job in two days.

This idea may be varied to meet different needs. For example, several hooks can be hinged directly to the spreader bar of the bridle. For simplicity and ease of handling, however, a three-drum hookup was suggested as the most practical where a large number of drums are handled.

MATERIALS HANDLING KINK

A reduction of overall materials handling costs was effected by an analysis based on the cost per ton foot for actual handling. To this was added such factors as the cost per machine tool minute for positioning heavy tools, castings, etc.; the cost per unit minute for batching; the value per sq ft or floor space kept free for maneuvering, making turns overhead, etc.; the cost per man-hour for hand handling; and the cost per equipment minute for stacking, tiering, picking up and putting down loads.

As a result of this study, the amounts of materials handling equipment in use were materially increased and the equipment in service was employed far more effectively.

★

MONORAIL SCALE SERVES DOUBLE PURPOSE

A monorail scale, intended for check weighing when batching, was located on a spur close to the new building monorail connection which goes up 3% grade to reach the new building level.

The operator uses the scale when in doubt about having enough tractive power to take a load up the grade within safety limits. Result: time wasted in trying to pull too heavy loads is eliminated.

★

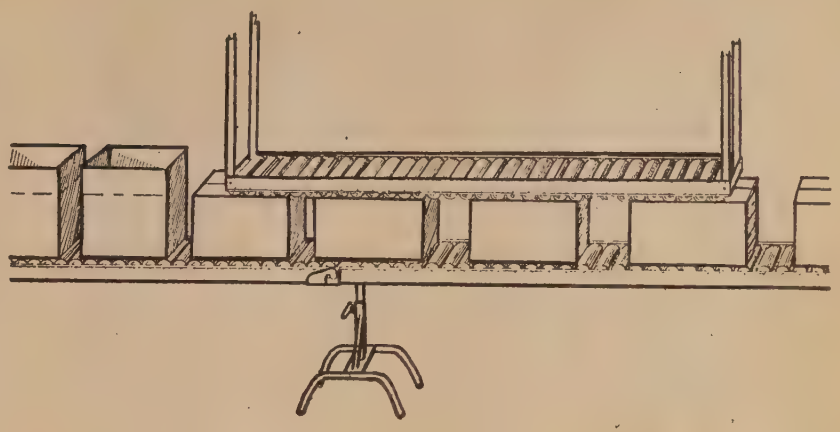
JIB CRANE SPEEDS SAWS

One heavy saw was moved close to another. A swinging arm electric hoist or jib crane mounted between them cut loading and unloading time. It let one skilled man serve both saws, freeing another skilled man to serve a second pair of saws and speed production.

★

MONORAIL SYSTEM FREES 16 MEN

One gantry crane and several monorail crane runways were installed for loading pipe onto flat cars. This equipment did away with 16 men formerly employed in rolling the pipe on skids.



ROLLER CONVEYOR DOES SEALING JOB

This carton sealer was made by Taylor-Reed Company for its own use.

A regular roller-conveyor section is inverted and laid over the cartons which ride on a roller conveyor line as well. After the carton flaps are glued and turned the cartons are pushed under the inverted roller for sealing. The weight of the top-side roller seals the cartons.

SPECIAL BAR AND CRANE MOVES HEAVY RACKS

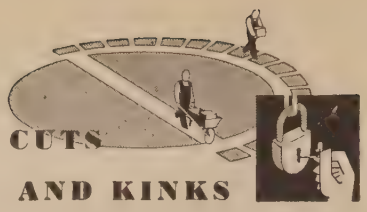
The Ryan Aeronautical Company has devised a special steel bar with a sliding engagement eye for quickly moving heavy storage racks and other similar objects throughout the plant.

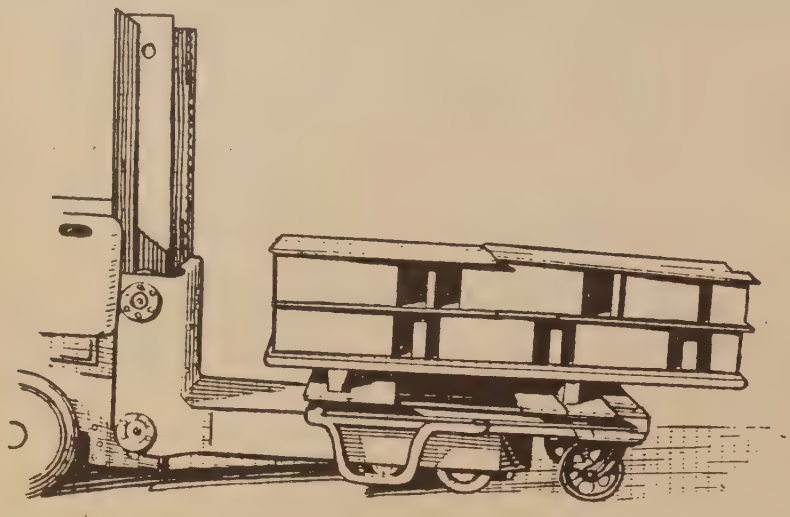
Frequent changes in production requirements necessitates the movement of storage racks, parts bins and other facilities used in aircraft manufacturing. This attachment is placed over the storage rack and quickly connected. Then, the hook from a traveling overhead crane is engaged in the sliding eye of the bar and the whole structure is rapidly lifted, moved and placed in its new location.

By means of this device, production needs are met without delay and a flexible assembly line can be maintained.

R. Raymond Kay

PRACTICAL SHORT CUTS AND KINKS





LIFT TRUCK CAPACITY TREBLED

By replacing two legs of a steel skid platform with a pair of casters, loads of as much as 10 tons can be handled with a three ton lift truck.

Because the weight of more than half the load is supported on the casters, there is no overload on the truck. The casters are welded to the skid.

This suggestion came from F. H. Horton, Transportation Supervisor, General Electric Company.

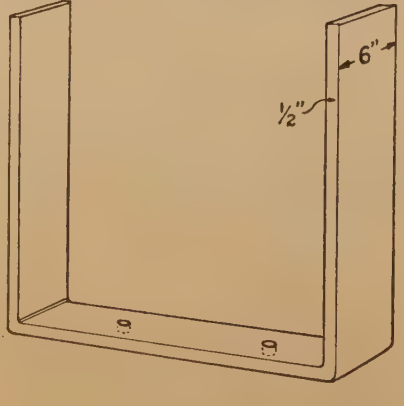
EASY-TO-MAKE PORTABLE RACK

Portable racks of this sort can be moved from place to place without any heavy lifting. They will hold flats, pipes, bars or angles.

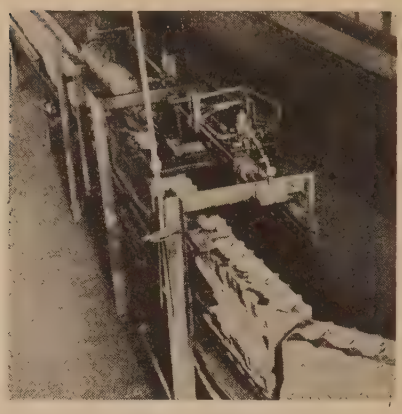
While in the rack, the material could be wired together for shipment or a sling placed around it for pick-up by the crane. This is an easy way to prevent injury to life and limb from piles slipping or rolling.

The rack is of U type and made of ½" thick by 6" flat bar, the 6" wide flat bar will allow the rack to stand without bracing. Or it can be attached to a 2" x 6" plank. The length and height of the rack will depend on the material you may want to handle.

This idea comes from William H. Mullen of Quincy, Mass.



CYLINDER BLOCK PUSHER



Formerly four men were required to keep the truck motor blocks moving and another man was needed to remove the core-wires in handling 195 units per hour.

By the new way only one man —the remover of the core-wires —is necessary because a compressed air cylinder, with a hinged dog at the end of the piston, engages the blocks at the start of the stroke and disengages at the end of the stroke.

★

CRANE INCREASES ELECTRIC TRUCK SPEEDS

Electric lift truck speeds and loads were held down by the need to go up a steep ramp.

Skid platforms were, therefore, provided with lifting lugs. A truck delivered its load to the foot of the ramp, then in its spare time, a crane took skid loads past ramp and past several aisles which were too narrow for good trucking speeds to a point where a second truck could pick up the load.

Truck loads and speeds now are those of level floors. A gain of at least 20% in trucking capacities was then obtained with the same trucks.

★

CRANE CUTS DOWN SWITCHING TIME

A bridge crane was equipped with special grabs to pick industrial railroad cars up from tracks in its spare time, take them from track to track or building to building. This operation cuts down the switching and waiting time of the electric yard locomotive.

AUTOMATIC HANDLING FOR GREATER EFFICIENCY

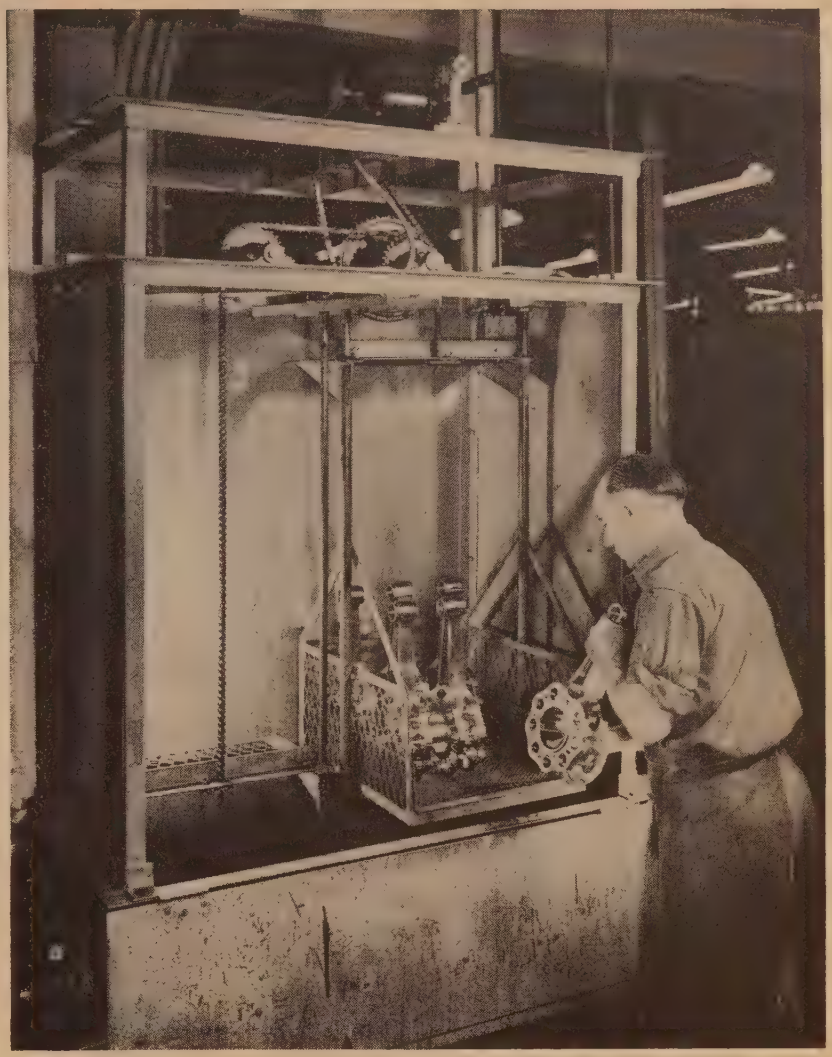
The use of automatic elevators in place of hand dipping for the degreasing and cleaning of master connecting rods made possible greater efficiency in production. It also eliminated the element of human inaccuracy.

These elevators, which are driven by an electric motor, were devised at the Buffalo Plant of Chevrolet Motor Division, General Motors Corporation.

The rods are placed in the elevator basket when they are ready for immersion into the cleaning vapors, which are kept at temperatures of 140 to 160 deg F. The operator pushes a button, lowering the elevator into the degreasing tank at a predetermined rate of travel.

An adjoining basket operates on a reciprocal hook-up. Thus, while one set of rods is being cleaned and degreased, another set can be loaded into the second basket.

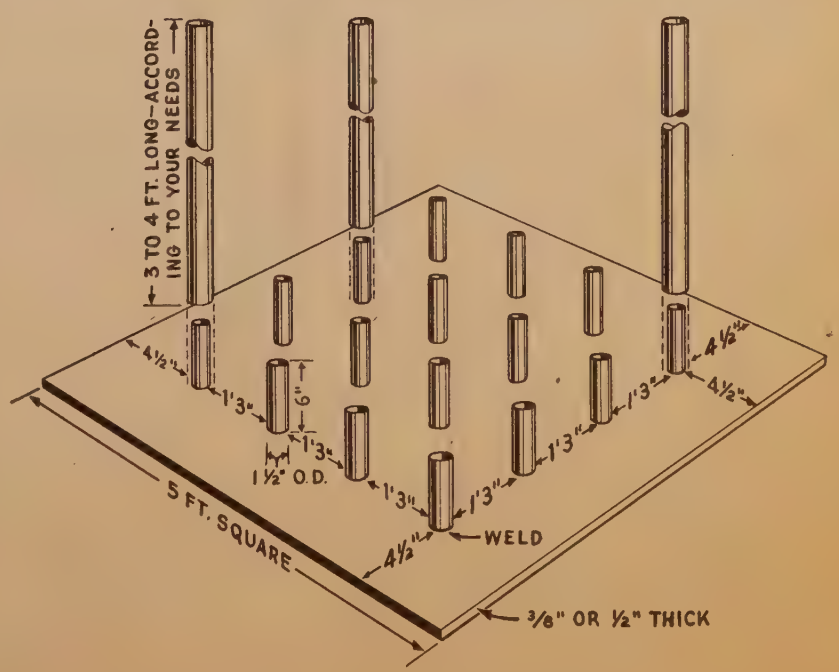
The main advantage of the elevators over the former method of suspending the rods on hooks and hand-dipping them is the absolute control of the rate at which the work travels through the hot and cold areas of the tank, both in immersion and in withdrawal.



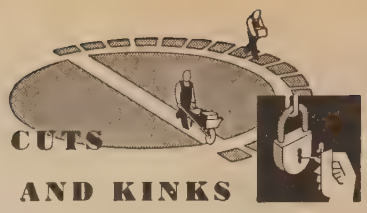
SAFE AND EASY HANDLING OF PIPE FLANGES

This handy portable device can be used for storing, sorting or counting of pipe flanges or any type of material that has a hole in it. The stand can be made from a 5′ square steel plate, ⅜″ or ½″ thick, with 16 1½″ pipes welded to the plate. Allow a 4½″ margin around all sides.

The portable pipe fitted to the stationary pipe will make material handling much easier. If the pipes are for reshipment, the device can be carried to the spot for packing without disturbing the pile. It is a safe way of handling pipe flanges because the flanges cannot fall on the workers' toes or make a mess out of a neat pile.



PRACTICAL SHORT CUTS AND KINKS



DUMPING HEAVY LOADS QUICKLY

The handling of metal scrap from machining, stamping and cutting operations has been simplified by adding what might be termed "built-in" pallets to conventional skid boxes used to collect this material. In other words, instead of resting on skids in the usual manner, the boxes have false bottoms which are open at two ends.

A steel plate as long as the box is turned up at a 90-deg. angle for 5 in. at each side of the box. The upper edges of these bent-up sections are then welded to the lower edges of the box, thus forming a trough, or pallet, about 4 in. deep integral with the box.

These skid boxes are used with an electric power truck equipped with a swivel mounted fork. In operation the fork is thrust into the pallet opening, the load lifted and conveyed to the shipping platform for dumping into street trucks. When the box is turned upside down to empty the contents, it is held securely to the fork by means of the bottom plate.

This operation is accomplished without having to change attachments or interfere with the usefulness of the truck for other handling duties. In fact, the same truck tiers loaded skid boxes whenever it is desired to store the scrap in a minimum of space awaiting disposal.

SAVING TEN HOURS IN TRUCK TIME

An electric stacking truck was used for many jobs, each of which was best done with a special ram, fork or grab. For instance, a ram was used for coiled wire, a fork for skid platforms, and a grab for bales of soft materials.

The custom had been to leave these devices on the floor, which practice meant a two man job to lift and change them, a hazard to personnel who might fall over them, and a tendency for the truck operator to drop them wherever convenient and have to hunt for them later.

A special multi-tiered platform was built, with special holding devices for each type of ram, fork or grab; the rams being laid in cradles, the forks on flat surfaces and the grabs hung on hooks.

Results: the truck operator can change these tools in two minutes each instead of needing ten minutes and the help of another man. A saving averaging ten hours per month of truck time is made.

★

DIE MARKING ELIMINATED

"Die marking" is a term used in the plastics industry to denote discoloration or other defects on a plastic article, due to the improper lubrication of a mold or die. It is a rather common defect, and it results in the rejection of dozens of pieces daily in virtually every large plastic molding plant.

At Plastics Die & Tool Corp., Los Angeles, this defect has been minimized—and may eventually be entirely eliminated—by lubricating injection molding dies with Silicone Oil. The oil is sprayed into the mold with an atomizer such as is used in spray painting.

Some difficulties have been experienced in finding adequate spray-gun equipment. When such difficulties are completely eliminated, die marking should be obsolete.

This item comes from Thomas A. Dickinson of Los Angeles, Calif.

★

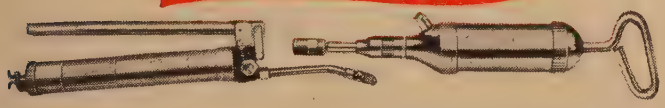
Alemite offers EVERYTHING needed for INDUSTRIAL LUBRICATION

Shown on this page are just a few of the items that compose the huge line of Alemite Lubricating Equipment and Lubricating Systems for Industry. This equipment is the result of many years of experience dealing with industrial lubricating problems—experience that has made Alemite the world's leading specialist in lubrication.

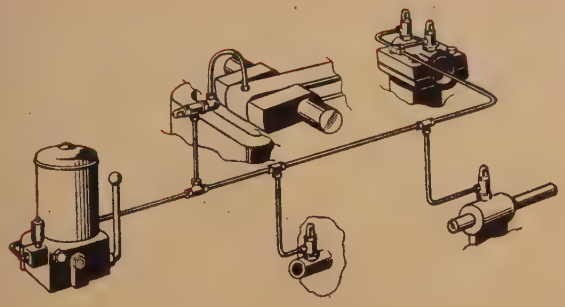
ALEMITE FITTINGS

Whatever type of fittings your machines need—hydraulic, pin type, dot, flush, button head, etc.—Alemite has them in all sizes and angles for every kind of industry.

ALEMITE HAND GUNS



The complete Alemite line of hand guns includes push types and lever types, medium and high pressure, for volume delivery of fibrous, heavy and light-bodied greases.



ALEMITE CENTRALIZED LUBRICATION SYSTEMS

These Alemite Systems handle oil or grease. They are designed for either manual or automatic operation. The feeder valves can either be mounted in or away from bearings. To lubricate a machine *even while it is in operation*, lubricant is introduced, at a safe, convenient, central point and forced through metal "arteries" to the feeder valve. These valves discharge a measured amount of lubricant to every bearing in the system. An indicator signals when the job is done. Hundreds of bearings can be positively, safely lubricated from one point. Human error is eliminated. Lubrication costs are reduced. Time, money and men are saved. Shutdowns are ended and production is increased. The over-all savings can enable you to amortize an Alemite Centralized System in as little as 3 months.

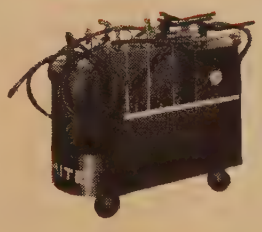
THERE ARE FOUR ALEMITE SYSTEMS

Each is adaptable to almost any type of machine, large or small, new or old. Have one or all 4 systems demonstrated right at your desk with transparent working models.

ALEMITE HAND PUMPS

All necessary equipment—gun loaders, gear pumps, volume pumps, etc.—for transferring, handling and applying all petroleum products. All Alemite equipment is ruggedly made for heavy duty work.

ALEMITE PORTABLE LUBRICATION UNITS



The line includes the Alemite LUBRIKART—a complete, compact portable lubrication department on wheels for dispensing oils and grease.

Also, the Alemite electric power gun for high pressure lubrication. 25-lb. capacity tank. Handles all types of light-bodied lubricants.

ALEMITE POWER PUMPS

5344 . . . is a volume delivery air operated transfer pump for semi-fluid and light-bodied lubricants. Transfer from original 400-lb. drum.

Heavy duty barrel pumps for volume delivery of lubricants from original drums. Models for high or low pressure—for handling oil or grease.

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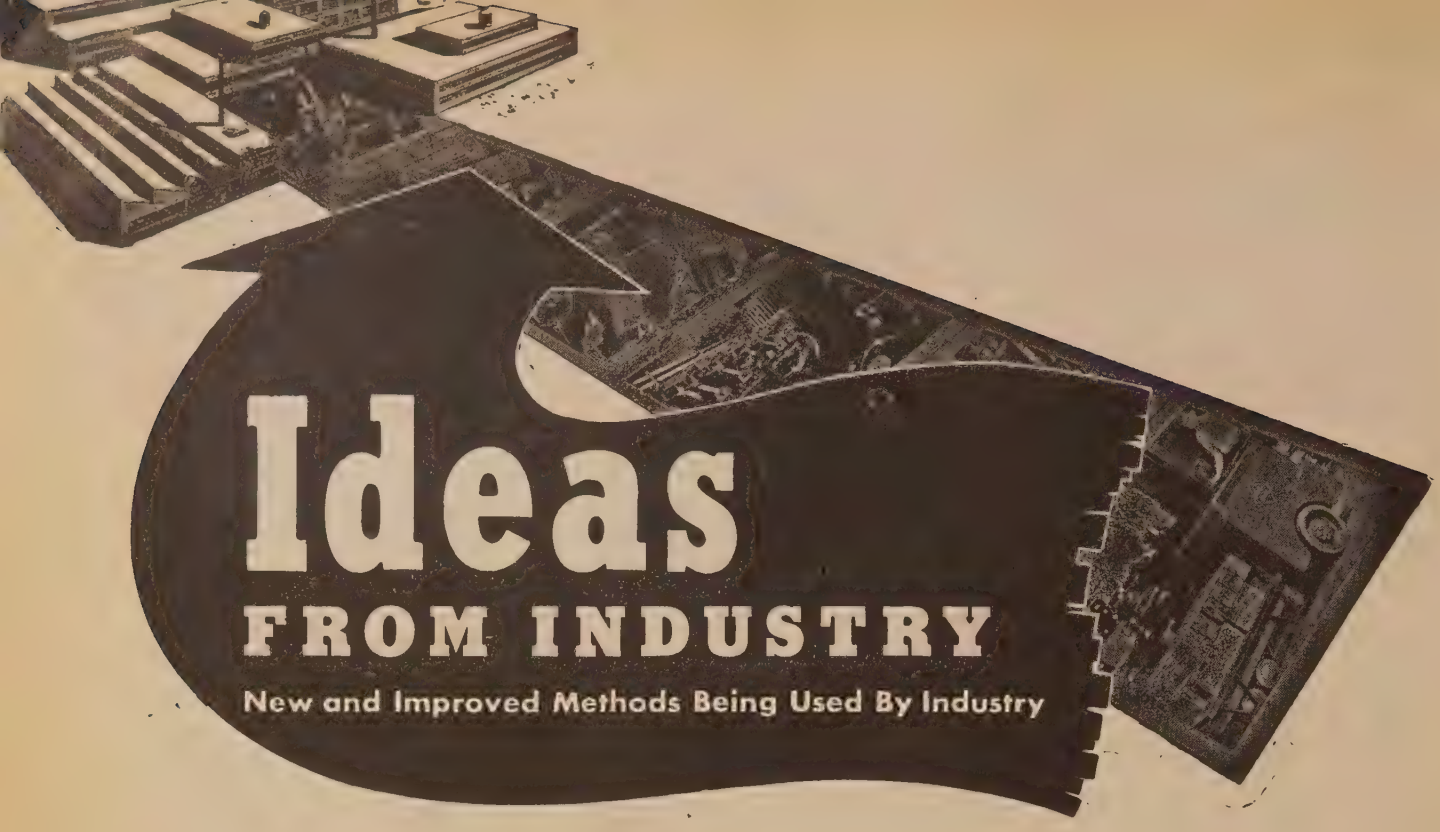
LUBRICATION EQUIPMENT

Another Product of STEWART WARNER

ALEMITE HELPS THE WORLD GO ROUND

1880 DIVERSEY PARKWAY • CHICAGO 14, ILLINOIS

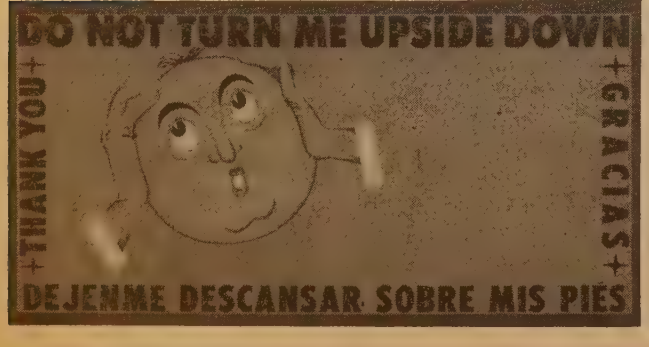


Ideas FROM INDUSTRY

New and Improved Methods Being Used By Industry

UNIQUE PACKAGE SIGNS SAVE SHIPMENTS FROM DAMAGE

The Philips Export Corporation uses colorful and eye-catching signs, printed in English and Spanish, on their shipments to South America. These warn the handler to keep the shipment right side up and to handle it with care. These effective warnings have created much goodwill among the handlers of the shipments and have been instrumental in reducing damage due to careless handling.

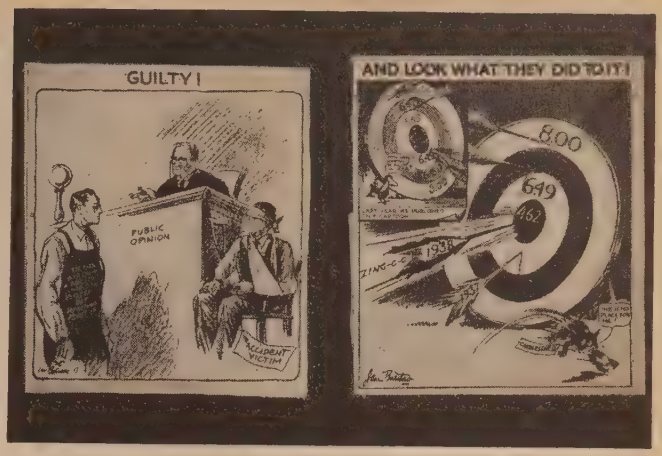


HAGAN EL FAVOR DE NO MALTRATARME
PLEASE HANDLE ME WITH CARE
DEJENME DESCANSAR SOBRE MIS PIÉS
STAND ME ON MY FEET
PHILIPS' RADIO

CARTOONS AID IN SAFETY EDUCATION

Cartoons and comic strips are used effectively at General Electric to educate employes on the importance of safety. The comic strip is built around the actions of a character called Hopeless Hector. At one plant, during a safety campaign, the entire Hector family arrived in person—with professional actors taking the parts of the characters. This naturally made quite an impression on the employes and started the campaign off with a bang.

The cartoons take a more serious vein, giving the reader a "shock" treatment by presenting facts starkly and graphically; a "pat-on-the-back" treatment that praises workers for good safety records; and a "bulls-eye" type of presentation which portrays a goal to be reached and the success with which it is being attained.



STRIKING GOLD IN THE PLANT

At regular intervals girls in Eversharp's Chicago plant strike gold. In one section of the plant scraps of precious metal fall from the machines which produce barrels, tips, caps and clips for quality writing instruments. In this department and others, $75,000 worth of gold is salvaged annually.

MAMMOTH TUBE TESTER

A super test set, newly designed by General Electric tube engineers, simulates actual electronic tube operating conditions for all types of tubes under many transmitting and industrial applications. The new tester, now under construction, is about the size of a giant 100 kw transmitter. It is expected to facilitate the development and design of new and improved tubes for FM, television and microwave equipment, in addition to industrial tube types.

INDUCTION SOLDERING OF RADIATORS INCREASES OUTPUT 280%

A 9600 cycle, 20 kilowatt Ohio Crankshaft Company Tocco machine, together with a 6-station work unit engineered by International Harvester Company, has permitted the latter company to increase the production rate of soldering radiator assemblies 280% over the hand method. An operator hand-soldering the assemblies could produce only 10 per hour. The high frequency heating setup permits an operator to turn out 28 per hour. In addition, by its more economical use of solder, the new method results in an annual saving of $7000 in solder costs.

● CIO MEMBERS HAVE ANNUAL MEETING

CIO made little impression on the general public with its eighth constitutional convention at Atlantic City, N. J. The proceedings were dwarfed by the ominous figure of John L. Lewis, who captured and held the stage with his coal strike.

In fact, one of the biggest splashes made by the CIO during its convention was the condemnation of the Government's injunction against the United Mine Workers.

While the CIO sessions were overshadowed, the convention went through all the motions of a bang-up labor meeting. Management and capital were excoriated from the rostrum. Union leaders gloated over labor's gains in the past, and called for the establishment of new and higher levels of wages.

In the background of this facade of tub-thumping, there was a grimmer problem—one that struck at the very existence of industrial unions. A knock-down drag-out fight might well riddle the strength of the CIO. Effects on the economy might be equally disastrous.

Phil Murray, who was reelected to the presidency, recognized this possibility clearly. He called for labor peace—asked management to bargain with labor for higher wages "like gentlemen."

Walter Reuther, who last year led the workers of General Motors into one of the most prolonged strikes in a major industry, again took "fight" as his keynote. Now, his call to arms is generally considered an empty threat. Still, threaten he did. He suggested that if management does not give in on a new wave of wage demands, all the unions of the CIO should contribute to a 10 to 12 million dollar war chest.

Much ado was made over ousting red influence from CIO councils. This was largely a concession toward the sharp swing against radical tendency in the Congressional elections. Little concrete action is expected within CIO ranks as a result of the professions of anti-red bias at the convention.

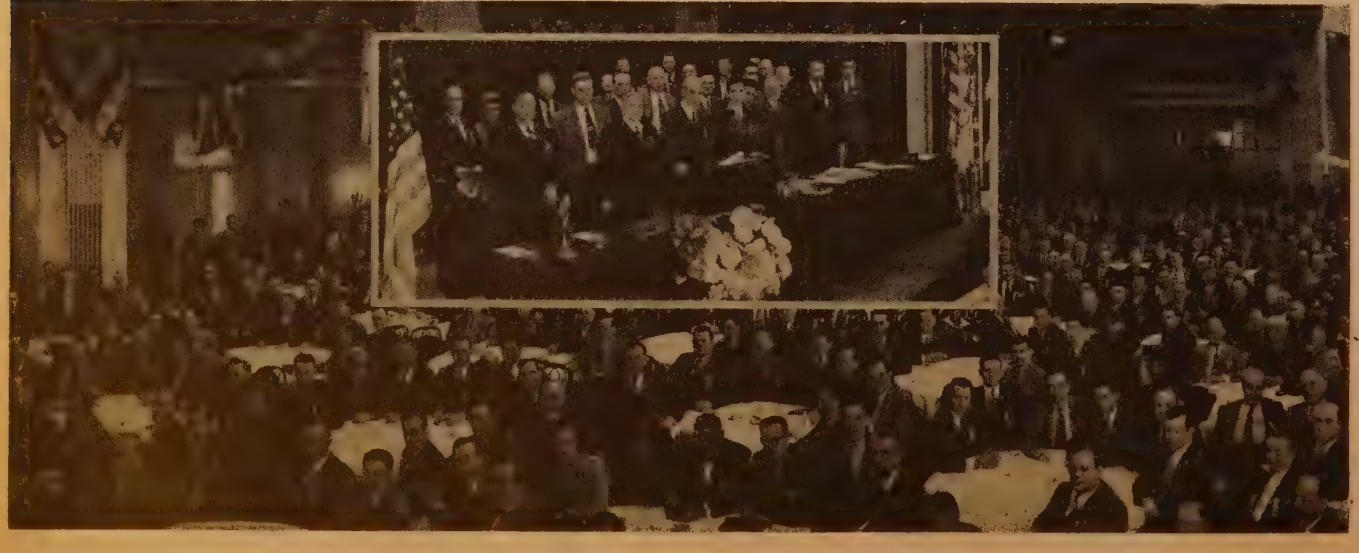
There were no surprises at the convention. The actions were in virtual accord with what had been expected. In presiding over the convention, President Murray made it clear that he expected complete support from the delegates, with a minimum of controversy and discussion. This was for the purpose of showing complete unanimity within the ranks.

Among the actions taken at the session were: in favor of the continuation of current tax structure as affecting larger incomes, but reducing income tax rates on lower incomes; in support of a 65c and later a 75c minimum wage level; support of the National Labor Relations Act; in favor of repeal of the Smith-Connally Act; in demand of "substantial" wage increases.

Despite the general repudiation of candidates which had been supported by the CIO during the recent election, the convention indicated its continued support of the Political Action Committee, and called for greater efforts by the membership toward influencing national and local elections.

Main target of CIO criticisms during the sessions was the present

(Continued on page 274)



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Factory Branches in Principal Cities

PORTABLE ELECTRIC
SKILTOOLS

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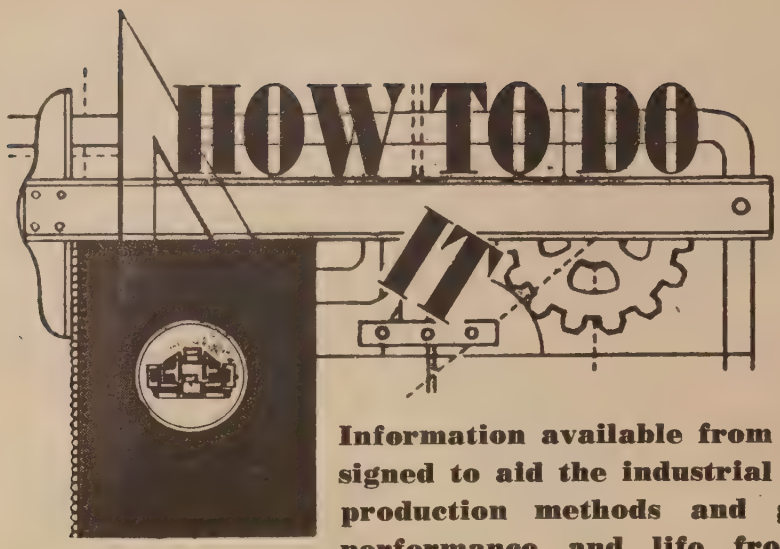


Information available from manufacturers designed to aid the industrial executive improve production methods and get the maximum performance and life from his equipment.

1. OVERHEAD SYSTEMS— Handsomely bound 268-page book, catalog D, presents 2 complete lines of equipment for overhead handling systems. One line, which loads up to and includes 2 tons, is carried on twin-section fabricated track. Carriers, cranes and accessories for this line are shown. Other line handles loads up to 5 tons and 10 tons. Pictorial sections are exceptional. Auxiliary equipment included. Hoist data section given. American Monorail Co.

2. TRUCK LOADING—16-page illustrated broadside describes fork lift truck small enough to maneuver easily in loading area of highway trucks and trailers while carrying loads up to 1000 lbs. on elevating forks. New loading method is described. Advantages claimed are faster loading; less idle truck time; lower cost. Clark Tructractor, Div. of Clark Equipment Co.

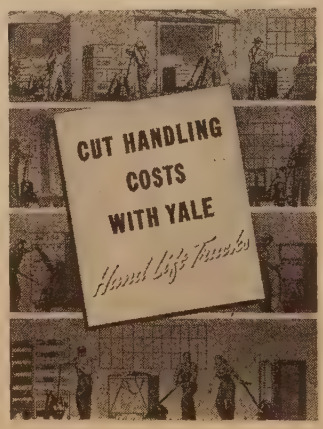
3. HOISTS & TROLLEYS—48-page catalog #38-C concerns chain hoists and trolleys. Explains types of chains and hoists and shows scale comparing types as regards speed, amount of labor, etc. Comparative data chart given. Presented in photos and text are hoist models, trolleys, winches and cranes. Ford Chain Block Div., American Chain & Cable Co.

4. BUCKETS—Well illustrated catalog #2076 presents two-line buckets in a manner to make it easy for purchaser to make his own selection. Pictures and factual data enable bucket user to coordinate his crane capacities with the data presented and select exactly the right bucket—whether for rehandling, hard digging, or dredging. Blaw-Knox Co.

5. HOISTS—Catalog #G558 describes chain hoist designed and built for rapid lifting and lowering with small effort by operator. Powerful frictionless swivel hook eliminates danger of load chain becoming twisted. Tells about care and operation of hoist; lubrication; operation principles, etc. Chester Hoist Co.

6. BUCKET ELEVATOR— New internally loaded loop type bucket elevator for gentle handling of small parts is described in folder #1983. Elevating medium consists of endless series of overlapping, inwardly-opening continuous buckets supported on pins of wide, power-operated strand of steel roller chain operated slowly over sprocket wheels at top of lift. Can be loaded on both sides, by chute or conveyor, and discharged on either side. Link-Belt Co.

7. HAND LIFT TRUCKS— Excellent 76-page catalog #S45 is devoted to selection and application of hand lift trucks. Book begins with discussion of basic materials



handling principles and types of loads handled, then considers types of industries using such trucks and how to select the right truck. One part of book is devoted to hand lift pallet trucks; how the pallet system works; recommended designs; application photos, etc. Yale & Towne Mfg. Co.

8. HOISTS—New bulletins describe in detail complete line of company hoists, including a ¼ ton hoist. Folder available also on a car puller. Specifications and other pertinent data included. Of interest to shop foremen, plant engineers, etc. American Engineering Co.

9. LIFT TRUCK—"Designed to Answer Today's Material Handling Problems" concerns lift truck rated at 2000 lbs. on 15" load center. Accommodates almost every type material. Roller chain lift has approximate speed of 45 fpm. Overall width is 32"; length from fork tips to rear, 64"; wheel base, 45". Forks are 4" by 30". Tilt is 3° backward and 15° forward. Has 2-cylinder air cooled motor with self-starter. Vaughan Motor Co.

10. BELTING HANDBOOK—Valuable 164-page book, "Handbook of Belting," is packed with information on bulk conveyors, package conveyors, elevator belts and transmission belting. Is planned to aid in correct application of belting so lowest possible cost of moving material and transmitting power is possible. Is essential reference book. Goodyear Tire & Rubber Co.

11. RACK CONVEYORS—"Overhead Crane Movement of Rack Conveyors" is subject of bulletin #46. Desirable where trucks cannot be moved across floor because of stationary equipment or other impediments. Racks can be picked up with overhead crane and moved to destination through air because crane hooks to special "superstructure" built into top of rack lifts it in perfect balance, and sets it down where required. Rack Engineering Co.

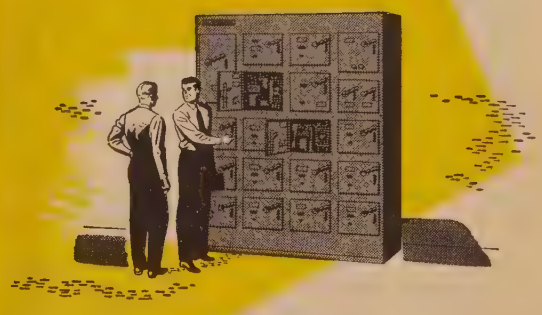
12. HOISTS, TROLLEYS, ETC.—Catalog #1946 has detailed information on chain hoists, low headroom trolley hoists, sling chains, trolleys, I-Beam switches, electric hoists, and cranes. Among those described is chain hoist with gyrating yoke feature instead of usual planetary gear system, and use of anti-friction bearing at each rotating point. Also shown is twin hoist—2 complete ball bearing hoists operated by one hand chain wheel permitting 2-point suspension in raising load. Chisholm-Moore Hoist Corp.

13. SLING SERVICE— Bulletin, "Wire Rope Sling Service," presents 7 aspects of sling service offered by company covering such features as: right combination, design, efficiency and safety; development of full body strength from end to end; use of preformed wire rope; accurate evaluation of sling safety, etc. Hazard Wire Rope Div., American Chain & Cable Co., Inc.

14. CHAIN— 160-page book #40 is designed as handbook of chain information for buyers and users. Gives definitions and

• Continued on page 170

A PART OF SQUARE D's PARADE OF NEW DESIGNS



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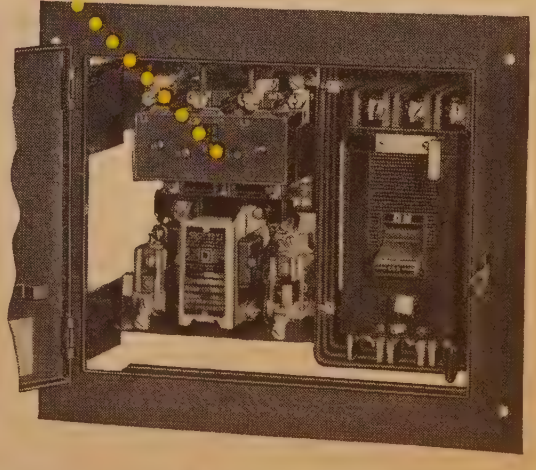

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• Continued from page 168

cautions governing purchase and use of welded chain; classification of grades of such chain and recommended uses, and care and maintenance. Various kinds of welded chain pictured and described. Cleveland Chain & Mfg. Co.

15. ROPE CARE—Valuable tips on how to care for rope—what to avoid and how to get full measure of service—are presented in booklet, "Care Saves Rope." How to avoid kinking and needless abrasion, storage hints, how to select rope, information on allowing for sling angles, a chart for matching rope to block, how to rig block and tackle, how to make splices and tie knots—such is information given. American Manufacturing Co.

16. ELECTRIC HOISTS—Bulletin #36 concerns electric worm-driven hoists designed to permit exceptionally close headroom and quiet operation. Built in variety of models, capacities, speeds and lifts. Hoisting unit is enclosed in oil-tight and dustproof gear case with oil bath lubrication. Electro Lift, Inc.

17. SLUSHER HOISTS—Interesting applications of slusher hoist and scraper units in development and production of ore bodies are shown in catalog #5300. The 1, 2 and 3-drum hoists are divided into air-powered units and electric-motor driven units. Complete information and illustrations of various types given in 50-page comprehensive brochure. Ingersoll-Rand.

18. CLAMP TRUCKS—Wide variety of uses in factories, warehouses, and food concerns is cited for clamp trucks described in bulletin. Foot pedal operates clamp of hand truck to proper opening to accommodate size of container being lifted. Pronged clamp arms get under load to hold with firm grip. Load can be lifted and carried upright without spilling contents of boxes or baskets. Can be used in crowded areas. Food Machinery Corp.

19. CRANES & HOISTS—Combined in single folder are catalogs presenting company's line of cranes and hoists. Well illustrated with application and other photos. One catalog is devoted to overhead crane data; another to engineering data on electric hoists; another to a bridge drive unit —motor travel for hand power crane bridges. Is excellent portfolio of material. Northern Engineering Works.

20. BELT CONVEYOR—New 30° inclined reversible belt conveyor for handling of packaged items from one floor to another is presented in catalog showing pictures, drawings and prices. Comes in 12 styles; can be supported from one floor, both floors, or may be of portable type construction. Rollers can be set high or low in 3½" formed channels with or without guard rails, or set low in 5½" formed channels in widths from 8" to 30" in 2" steps. Harry J. Ferguson.

21. HOISTING EQUIPMENT—Catalog PD-25 reprint has worthwhile and informative treatment of hoisting equipment. Opens with explanation of 3 types of chain hoists and their varying efficiencies and tells how to select proper type of hoisting equipment. Specifications, diagrams, photographs

HOW TO DO IT

and such pertinent material given on winches, sheaves, trolleys, and various hoists. Yale & Towne Mfg. Co.

22. BALING—Interesting presentation friction seal method of baling is given in bulletin Form AD58 through a blue print

diagram of the procedure. Detailed instructions are included in text and photographic views show application of the strapping to containers. Idea is to "strap that box and ship it as a bale." Acme Steel Co.

23. SHOP TRUCKS—Bulletin #1255 presents three models of industrial shop trucks. Has pictorial presentation of their uses; lists specifications, sizes and models, and construction features and claims economy (30 to 40 miles per gal. of fuel); easy maneuverability; easy driving; safety; reliability; sturdiness; speed, and accessibility. The Buda Co.

24. SCALES—Bulletin sheet #G507LP describes general purpose scale equipped with convenient commodity platter and useful for weighing loose commodities in bags, cartons, packages, etc. Speedy accurate weighing provided by specially designed air-controlled dash pot of large diameter which cushions movement of the scale. Detecto Scales Inc.

25. LIFT TRUCK—Bulletin presents lift truck said to enable any operator to handle 4000 to 6000 lb. loads with comparative ease. Has electric hydraulic lift as well as electric travel; finger tip control for all operations; compound wound motor for high torque and overload capacity; two speeds forward and reverse with handle in any position; vertical lifting and lowering; high frame clearance for ramps and uneven floors. Barrett-Cravens Co.

26. HAND TRUCKS—Catalog #T-45 concerns hand trucks for variety of uses such as handling bags, boxes, barrels, bales, grain and other cargoes, etc. Have accurately machined wheels and axles to insure easy rolling and floor-saver cushion rubber treads. Other information given. American Pulley Co.

27. SELECTING ROPE—"Play Safe When Selecting Your Rope" is folder presenting qualities necessary in a good rope; the qualifications of Manila rope; storage and handling tips, etc. The Edwin H. Fitler Co.

28. VIBRATING CONVEYOR—Bulletin #32 presents vibrating conveyor consisting of pan or tube, a vibrating or shaking mechanism, and a motor, variable speed drive, countershaft or other source of power to drive the shaker. Construction details outlined. Used in industries such as abrasives, ceramics, cereals, chemicals, clay, foods, foundries, grains, rubber, and others. Ajax Flexible Coupling Co.

29. SKIDS, LIFTS, ETC.—Bulletin #1008MH shows company's materials handling products with descriptions and illustrations. Included are load-lifts, skid platforms, semi-skids and jacks, portable conveyors, load carrier trucks, knocked down truck parts to build your own trucks, and industrial casters. Market Forge Co.

30. BELT CONVEYOR—"Your Man Friday" is bulletin #SJA-46 giving descriptions and photographs of latest developments in power belt conveyor, including exclusive cable-lift elevation devices which facilitate adjusting operating pitch of the belt while stacking materials at various levels. The Rapids-Standard Co., Inc.

31. OVERHEAD HANDLING—56-page brochure #C-1 is excellent pictorial presentation, with descriptive text included, of uses of overhead handling equipment in industries. Outlined individually are advantages of monorail, the trolley wheels, electrification, cranes, etc. Auxiliary equipment also presented such as elevator tower for lift section, scale hoist carrier, sheet steel grab, air cylinder dipping section, etc. Applications in varied industries shown. The American Monorail Co.

32. BELT LACERS—Semi-looseleaf 46-page catalog #52 has information on company's products including lacers for belts from 1/16 to ⅜" thick; belt hooks for same size belts; lubrihide, rawhide and bamboo pins; belt cutters; and tape lacing equipment. Tables show shipping weights of various items for domestic and export packing. Clipper Belt Lacer Co.

33. OVERHEAD HANDLING—"How to Determine Where Overhead Materials Handling Equipment Can Be Used Profitably" is catalog #2004-B. Includes elements of a materials handling system and preparation of a simple layout. Presents elemental equipment and shows installation photographs. Person can inspect plant and study all operations involving materials handling, then put down findings in form of a simple layout as illustrated in brochure. Cleveland Crane & Engineering Co.

34. WIRE ROPE—Semi-looseleaf 130-page handbook #165 entitled "Wire

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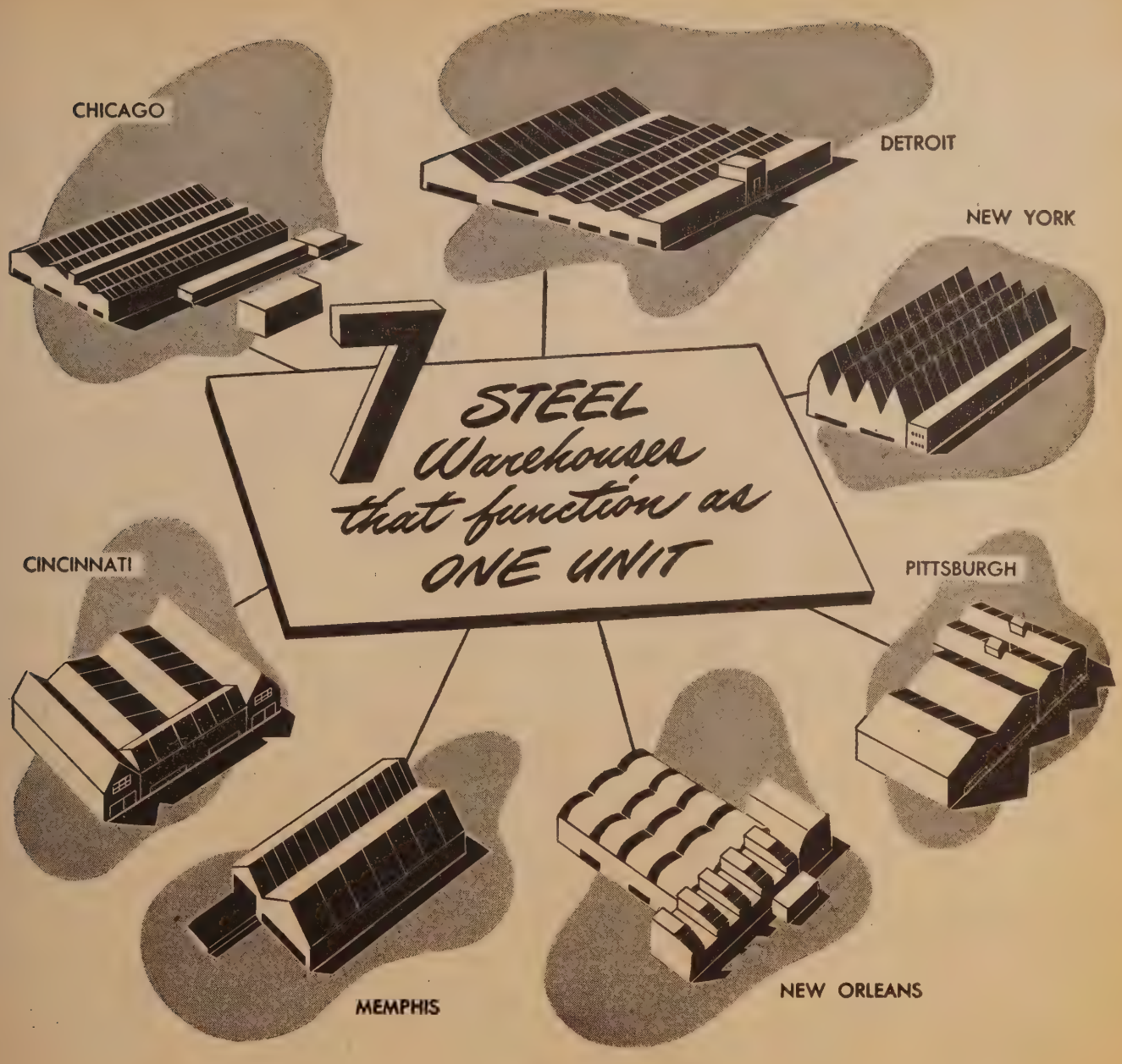

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• Continued from page 170

Rope" is packed with information. Lists standard wire ropes in conformity with Simplified Practice Recommendation R198-43. Five grades of wire rope presented. Color chart for tape wound around wire rope core to identify rope is given. Variety of information included. Bethlehem Steel Co.

35. CRANES— Bulletin H13-1 describes cranes built to offer low cost crane service where loads up to 15 tons are lifted, lowered or moved. Said to effect savings where larger, high duty cranes are not warranted. Has electric push button control. Harnischfeger Corp.

36. BELTING—An account of the construction of the conveyor belting (a special sticky, moisture-resisting rubber compound is applied under pressure of hot rolls to the dry duck fabric) precedes description of various kinds of belting as used in industry, agriculture, coal mines, food processing. Maintenance suggestions are given for each section. Hewitt Rubber Corp.

37. TRUCK CASTERS—Catalog #K-36 concerns truck casters and materials handling equipment. Listed in comprehensive 50-page catalog are descriptions, dimensions, prices and codes covering each article of line of truck casters. Includes reference table showing overall heights of casters. Shown also are lift jacks, work benches and tables, and various hand trucks. Bond Foundry & Machine Co.

38. A-C MAGNETIC CONTROL—Bulletin GEA-3191A describes control for wound-rotor motors involved in control of materials-handling equipment. Gives kinds of controls for hoist motions equipped with automatic mechanical load brakes; for applications where reversing is not required; an especially designed control for bridge, trolley and rotational drives; for application where accurate jogging and stable slow speeds are not required. General Electric Co.

39. TURRET TRUCKS— Described as innovation in mechanized materials handling equipment are turret trucks shown in bulletin #4602-10M746. Designed for in-between-handling of loads too big for manual movement and too light for heavy equipment. Power plant and drive wheel are built as single rotatable unit. Fast reversing accomplished while drive unit is in motion. Salsbury Motors, Inc.

40. SPLICING—Bulletin presents information on safety splice for rope which makes hand splicing obsolete and unnecessary. Can be used in connection with any standard fitting. 10 points of superiority are listed such as guarantee of 100% efficiency in strength through life of rope; equalization of stresses in all strands; no seizings to loosen and get in way; no wire ends to injure hands; etc. American Cable Div., American Chain & Cable Co.

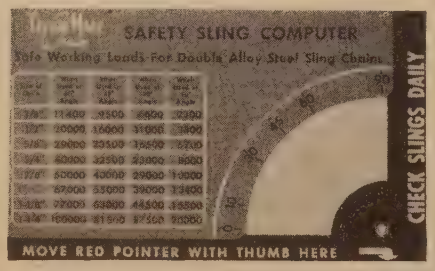
41. PORTABLE CRANE— Bulletin #8.5M describes portable floor crane as 4-in-1 tool, a crane, hoist, shop truck, and portable ladder. Can be used by one man to reach out of way places where overhead conveying systems cannot reach. Made in 8 sizes from 1 to 3 ton capacity. The Hill Acme Co.

42. PULLEYS—Anyone concerned with transmission operations attendant on certain materials handling operations should be

HOW TO DO IT

interested in bulletin, "Steel Split Pulleys." Grooveless oval crown of pulley provides belt contact over entire face of pulley resulting in low operating costs due to low belt tension and reduction of bearing friction. Dodge Mfg. Corp.

43. SLING COMPUTER— Handy computer is designed to give hookers an accurate yardstick to determine maximum safe load that a sling chain can lift at any given angle. Is printed on plastic and can be


SAFETY SLING COMPUTER
Safe Working Loads For Double Alloy Steel Sling Chains
CHECK SLINGS DAILY
MOVE RED POINTER WITH THUMB HERE

kept clean for easy reading. Hooker sights through computer window on one leg of sling chain; then moves needle of computer to line up with leg sighted. Angle of chain is read at end of needle. Safe working load for size chain used is then found on scale on opposite side of computer. S. G. Taylor Chain Co.

44. CONVEYOR BELTING— Bulletin #3732 concerns conveyor and elevator belting. Included are neoprene conveyor belting for usage under oily conditions, belt duck and synthetic rubber belting for conveyors. Various types in elevator belting described, also. Tables given for: capacities for various width-speed combinations for troughed conveyors; for materials handled by conveyor belts, and for grains handled by conveyor and elevator belts. Thermoid Rubber, Division of Thermoid Co.

45. CONVEYORS, FEEDERS — Wide range of materials from reagents to heavy ores is handled by electric vibrating feeder with precision control shown in bulletin #25B6177B. Included is apron conveyor built to withstand impact of large material loaded directly by power shovels, and apron feeder for standard duty service. Allis-Chalmers Mfg. Co.

46. TIRES—Informational data is included in catalog #T-45-39 on load-rated industrial tires for all different types of materials handling equipment. Discusses care and maintenance of the tires; points out special features, uses, specifications, table of maximum loads. Has several pages of industrial truck manufacturers' tire specifications. United States Rubber Co.

47. HOISTS—Catalog P has compilation of catalogs pertaining to chain and electric hoists, hoist parts, trolleys and cranes. The electric hoist section, for example, takes up methods of suspension such as hook; hook from geared trolley; lug, etc. Trolleys for I-Beam and for flat rail and trolley parts, I-Beam track, hangers, switches and turntables—such are products described. Chain and hook data are subject for one bulletin. The Harrington Co.

48. WIRE ROPE CLAMPS — 40-page catalog, "Wire Rope Clamp," is unusual with excellent drawings showing applications of clamp and giving test reports of its use. Is described as a "natural form fitting" that cannot slip and will hold any 6 or 7 strand preformed or non-preformed right lay wire rope. National Production Co.

49. PNEUMATIC TIRED TRUCK — "The Only 4000 Pound Industrial Lift Truck on Pneumatic Tires" is title of bulletin #1016C-10M. Truck is gas powered; hoists and transports heavy or bulky loads inside and out in any temperature. Application photo shown. Ease of operation claimed. Ends with page of questions and answers. Hyster Co.

50. ELECTRIC HOISTS— Bulletin, "Electric Cable Hoists," claims features such as lightest weight, smallest size, most accessible, and strongest, thus making it easy to put up or take down; causing less weight on structural members of building; requiring less space; saving time in adjusting or replacement, etc. Claims 200 lbs. lighter weight than other heavy duty hoist of similar rating. Lisbon Hoist & Crane Co.

51. KNOW YOUR ROPE—1946 edition of "Know Your Ropes" is MUST manual for anyone concerned with wire rope selection, application, and usage. Has 81 pages of know-how information. Just a few subjects are lubrication, cutting wire rope, bending stresses, fatigue rope life, heat deterioration, handling, overloading, safety factors, speed, and splicing. Wickwire Spencer Steel.

52. TIRES—"How to Save Money on Industrial Hauling Jobs and Equipment" is 37-page brochure #5-7245-GP on industrial tires which opens with 6 savings features to users: faster movement, through less vibration, etc.; less floor wear; less noise; reduced breakage, and less depreciation. Tests are described and findings given. B. F. Goodrich Co.

53. ELECTRIC TRUCKS—General catalog has complete specifications and descriptive information on electric propelled industrial trucks. Includes power units for pallet and platform and for a towing-type and push-type unit. Telescopic, tilting, tiering, central control fork trucks of 2, 4, 5, 6, 7 and 8 thousand lbs. capacity shown; also 4, 6 and 10 thousand lbs. capacity low-lifting elevating platform truck. Automatic Transportation Co.

54. HOISTS—Bulletin C-100 shows hoist models including safety-pull ratchet lever hoists, quick-lift electric hoists, spur geared chain hoists, etc. Ratchet lever hoists said to be useful in close quarters where a full stroke of the level is not permitted. I-beam trolleys and utility maintenance tools shown. Coffing Hoist Co.

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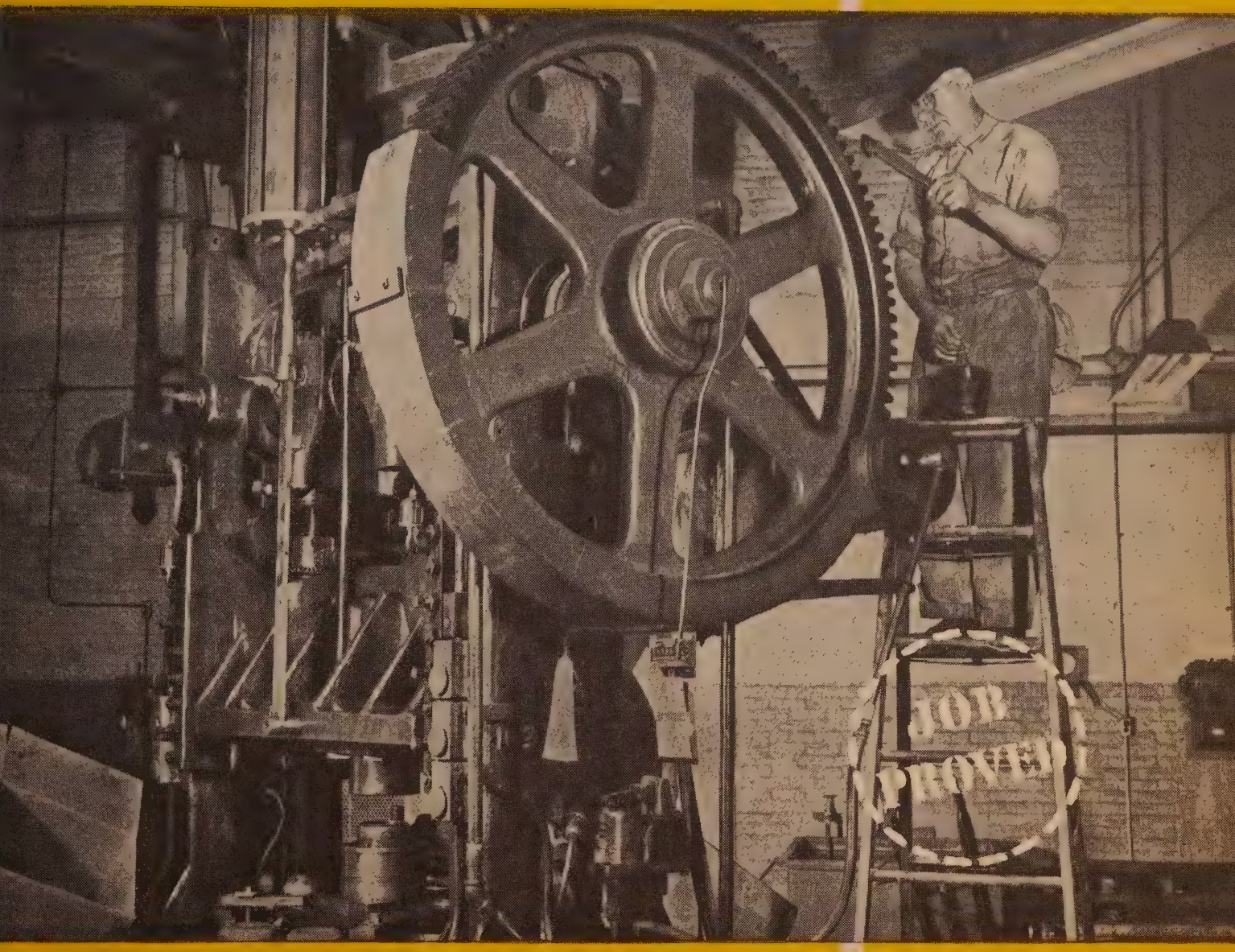
Bringing Down High Maintenance Costs



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INDUSTRIAL PRODUCTS

• Continued from page 172

55. CRANES— Catalog #213-B gives illustrations, descriptions and outline dimensions of standardized production built cranes ranging from small push type crane bridges to large capacity hand operated cranes, also those with electrically operated hoists for "stand-by" service. Hand operated cranes, double girder with all motions manually operated by pulling on endless chains, are available to lift maximum loads weighing from 3 to 50 tons in any span required. Manning, Maxwell & Moore, Inc.

56. SLINGS— 70-page semi-looseleaf catalog #A-899 concerns wire rope slings for repair shops, foundries, machine shops, etc. Listed are many different designs. Wire rope fittings shown. Three types of sling loads and recommendations of slings for each are given. John A. Roebling's Sons.

57. TRUCK-CRANE VEHICLE — Bulletin #65 presents materials handling vehicle which performs varied applications and speeds flow of goods, saves manpower and cuts handling costs. Is used as mobile crane, fork lift truck and ram truck. Handles loads of any shape or size up to 5 or 7½ tons; transports and tiers; is used inside or out. Silent Hoist & Crane Co.

58. HOISTS— 44-page, well illustrated catalog #127 on electric hoists contains valuable information on adaptability and application as well as on mechanical details. Lists speeds, lifts, dimensions and other data useful to the plant executive or engineer. Shows applications of each type of hoist. Shepard Niles Crane & Hoist Corp.

59. WHEELBARROWS— Circular bulletin #51 shows various models of wheelbarrows with description of construction features, uses, and specifications. One model is designed for wheeling dry materials; another for hard service in foundries, etc.; another for handy delivery of coal. Sterling Wheelbarrow Co.

HOW TO DO IT

60. ELECTRIC HOIST — Catalog #W39 concerns wire rope electric hoist air-cooled through a blower action applied in design of hoist to produce effective degree of low pressure air circulation and cooling on the brake frictional parts, thus eliminating excess brake heat. Has 42 pages of information on standard types, speeds, weights, dimensions, design, construction and other pertinent data. Yale & Towne Mfg. Co.

61. FOUNDRY CONVEYORS—16-page bulletin #370 is entitled "How to Handle It in the Foundry." How to handle molds; how to transport and recondition sand; how to get castings from one place to another—such are problems discussed. Gravity roll and power conveyors for conveying molds, and shake-out, apron, and belt conveyors, elevators, vibrating or revolving screens, bins—such are subjects taken up. Chain Belt Co.

62. HOISTS, TROLLEYS, CRANES — 4 types of chain hoists made by company and their respective uses are compared in catalog #12-D. Chart gives comparative information on rated capacity, pull in pounds on hand chain to raise full load, etc. Trolleys flexible enough to round small radius curve and taking but 11 lbs. push to move a 1 ton load are included. Wright Mfg. Div., American Chain & Cable Co.

63. CASTERS & WHEELS —Catalog #24 on truck casters and industrial truck wheels has 40 pages of information on types of casters, such as swivel and rigid; medium duty, swivel brake, medium duty, tongue swivel, offset rigid, etc. Information given on installation and measuring of a truck caster. Various wheels, their selection, etc., also included, along with index to code words. Divine Brothers Co.

64. CRANE—A crane with boom swing of full 90° either side of front center with automatic stop is presented in bulletin #645-8R-IHC. Is reversed drive crane with drive wheels at front end, extended wheel base, dead-axle-mounted drive wheels. Has left hand drive, 2-man seat, and 25 gal. gas tank. All crane operations of load hoisting, boom topping and boom swing can be performed independently or simultaneously. Hughes-Keenan Co.

65. ART OF PILING— 12-page pictorial brochure #148 shows how to pile cases, rolls, boxes, crates, barrels, drums, bales and other material, including special machines for dumping, feeding and positioning. Has typical views of portable elevators and other materials handling machines. Revolvator Co.

66. CHAIN HOSTS— 28-page booklet #M-70 is of practical help in selecting hoisting equipment to suit individual requirements. Factual information and brief descriptions are given for chain hoists, extended hand wheel hoists, trolley hoists, trolleys, cranes, crabs and winches, column hoists, and twin hook hoists. David Round & Son.

67. LIFT TRUCK—Hydromatic lift truck described in bulletin has following features listed: new type hydraulic ram to insure easy lift, positive action and safety; automatic lifting engagement and automatic release for speedy action and safety; easy rolling ball bearing wheels with bearings sealed in lubricant; all steel construction; all parts standardized and interchangeable; easy side lift, balanced handle and easy steering. Lift Trucks, Inc.

68. FREIGHT CAR MOVERS — Two bulletins describe models of freight car movers with double spurs and rail guides which will straddle a 160 lb. rail. Spurs are said to grip rail so car mover can't slip. Compound leverage is supplied so that a forward push by one man, instead of an uplift, is exerted in moving operation. Appleton-Atlas Car Mover Corp.

• Continued on page 270

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Latest New Products to Reduce Costs or Increase Production

EDITORIAL BOARD AWARD

Judges' Choice For January

AUTOMATIC LEVELING LADDER BASE

Features: Consists of an aluminum truss automatically leveling the ladder laterally on a half circle of strong steel pipe. Carborundum abrasive shoes, on ball and socket joints, assure a firm grip on any surface. The base requires an adjustment by the workman but instantly adjusts itself automatically to the ground level underfoot, levels the ladder and is automatically locked in place by the weight of the ladder. When the ladder weight is lifted in moving to a new position, the base automatically unlocks for leveling at the new location.

Manufacturer: Akron Steel and Sales Inc., Akron, Ohio.

JUDGES
WILLIAM A. PARKER, Chief Engineer
Dixon Valve & Coupling Co.
M. A. CAVANAUGH, Superintendent of Plant Maintenance
The Budd Company

HOW AWARDS ARE MADE

Each month the selection board certifies for previews the new plant equipment products that appear to be most useful for the industrial plant. Their choices are taken from a wide assortment of items carefully compiled by the editors after extensive research. Their selection is based on the newness of the product, its wide application and its ability to save time and money or improve working facilities.

Continued on following pages

This **PLANT EQUIPMENT PREVIEWS**

section includes, along with the new products announced this month, a review of many new products introduced in the materials handling field during the past year.

JANUARY, 1947

PEP 2

TWO TON ELECTRIC HOIST

Selection Board's Opinion: Fulfills functions of heavy-duty hoist.

Manufacturer: Yale and Towne Mfg. Co., 4530 Tacony St., Philadelphia 24, Pa.

Features: Adds to previous line of 1/8, 1/4, 1/2, and 1 ton hoists, and fits into many industrial applications where heretofore heavy-duty electric hoists were employed. The 2-ton hoist is equipped with a 1 hp. motor. Lifting and lowering action is obtained by a flip of wrist on the one-hand, bar-grip control, leaving the operator's other hand free to guide the load.

JANUARY, 1947

PEP 3

INCLINED BELT WITH HORIZONTAL FEED SECTION

Selection Board's Opinion: Many possible uses.

Manufacturer: Standard Conveyor Co., North St. Paul 9, Minn.

Features: Used for elevating and lowering commodities, it provides an "off the shelf" conveyor for this common handling problem. A rough surface belt is furnished for the conveyor which is set permanently at 28 degrees. Belts are made in lengths for floor to floor elevations of 8'-0" to 14'-6". The machines can be furnished with or without the horizontal feed section at the bottom.

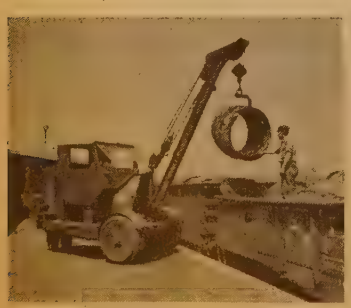
JANUARY, 1947

PEP 4

MOBILE CRANE

Selection Board's Opinion: Good general all-round utility crane.

Manufacturer: Silent Hoist Winch & Crane Co., 841-877 63rd St., Brooklyn, N. Y.



Features: From one comfortable seat, operator has easy access to controls for hoisting, swinging and topping the crane and to the controls for traveling forward and reverse. One engine provides power for crane mechanism and traveling. For indoor or outdoor use. Has large traction and steering wheels. Chassis is fitted with either gasoline or diesel engine. Available in 3 standard sizes: 5000 lbs, 10,000 lbs and 20,000 lbs capacity. Can negotiate grades up to 15% under load.

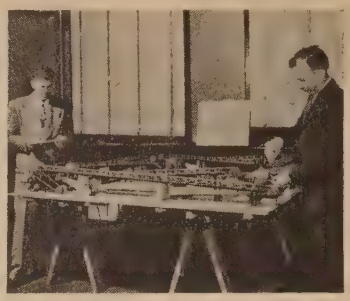
JANUARY, 1947

PEP 5

TWO-WAY CONVEYOR BELT

Selection Board's Opinion: New principle in handling bulk materials.

Manufacturer: The Goodyear Tire and Rubber Co., Akron, Ohio.



Features: In the two-way conveyors the belts are installed in a manner that permits each belt to carry material on the return trip, thus continually utilizing the top cover of the conveyor. The belt has its main application in the steel industry where ore can be hauled in and slag taken out on the return run.

JANUARY, 1947

PEP 6

WHEEL-CONVEYOR SPUR CURVE

Selection Board's Opinion: A versatile unit.

Manufacturer: Rapids-Standard Co., Peoples National Bank Bldg., Grand Rapids, Mich.

Features: Permits users a choice of directing flow of materials either straight through to one destination or around the spur curve to a line running at right angles to the main line. Thus packages containing different commodities may be sorted and routed to their designated storage areas or to loading docks for shipment.

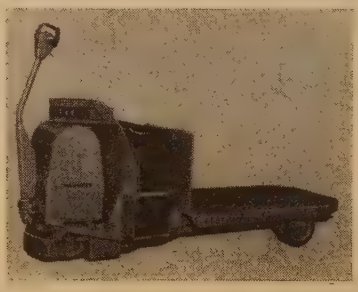
JANUARY, 1947

PEP 7

HAND TRUCK

Selection Board's Opinion: Sturdy and of improved design.

Manufacturer: Automatic Transportation Co., 149 West 87th St., Chicago 20, Ill.



Features: Added ruggedness, more effective safety features and a simplified design make for greater ease in inspection, maintenance and adjustment. Made in 4 models: 4000 and 6000 lb capacity models for use with skid platforms; 4000 lb capacity pallet model, and a 3000 lb capacity special pallet model for tinplate.

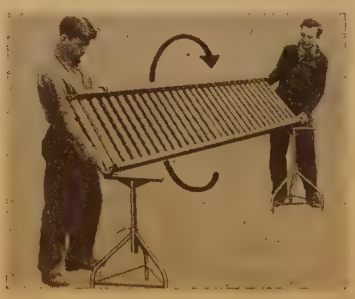
JANUARY, 1947

PEP 8

CONVEYOR

Selection Board's Opinion: Many versatile units.

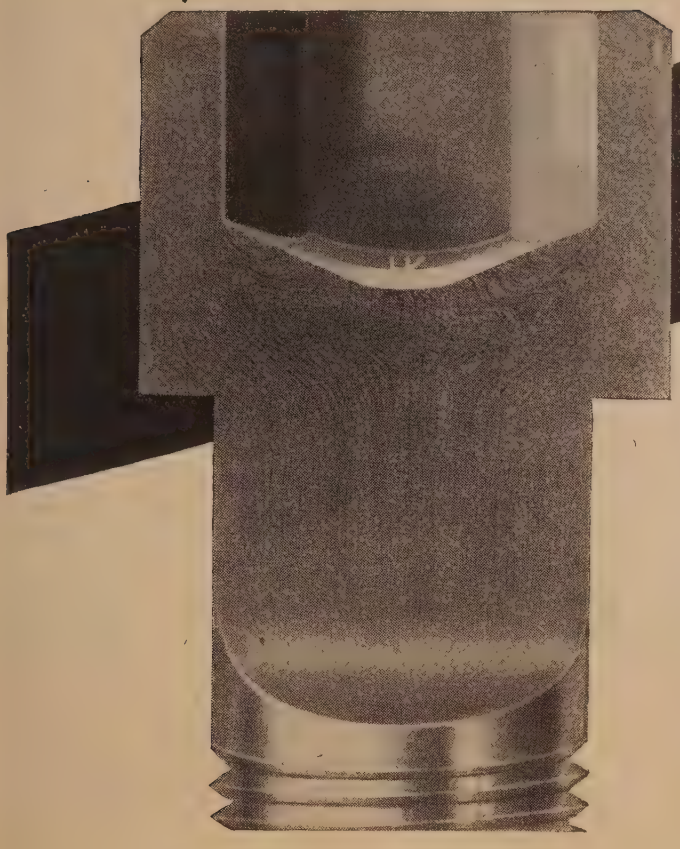
Manufacturer: Harry J. Ferguson. 115 West Ave., Jenkintown, Pa.



Features: A portable dual purpose gravity conveyor. Set in low position the channel side rails form a protective guard; set in high the elevation of the rollers permits the handling of packages larger than the width of the conveyor.

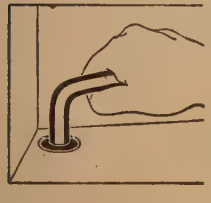
• Continued on page 180

UNRETOUCHED PHOTO ETCHED CUTAWAY
HOLO-KROME SOCKET HEAD CAP SCREW



Completely Cold Forged

INTERNAL WRENCHING



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Exclusively Holo-Krome! Continuous Fibres running from end to end — uninterrupted, unbroken and unsevered! Accomplished exclusively by the Holo-Krome patented method of Completely Cold Forging and sold thru Holo-Krome Industrial Supply Distributors under the registered trade mark name "FIBRO FORGED" Socket Screws . . . Specify "Holo-Krome" and get these guaranteed unfailing performance Socket Screws.

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INTERNAL SOCKET SCREWS WRENCHING

• Continued from page 178

JANUARY, 1947

PEP 9

ALL-STEEL SKID PLATFORM

Selection Board's Opinion: All welded construction—lightweight.

Manufacturer: Market Forge Co., 78 Garvey St., Everett 49, Mass.

Features: Made in any required size and for any specified lift truck. Steel deck panels of medium gauge high-tensile strength steel form the load carrying surface and provide an even surface desirable for handling sheets of materials such as paper, rubber, leather etc. Absence of bolts or rivets in construction reduces maintenance to a minimum. Weight of platform is about 20% lighter than conventional types.

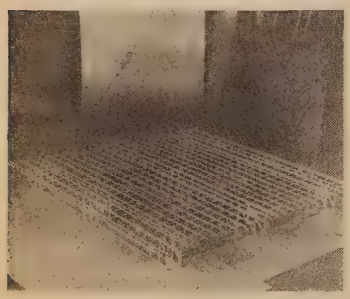
JANUARY, 1947

PEP 10

8-WAY STEEL WIRE PALLET

Selection Board's Opinion: Lightweight and durable.

Manufacturer: Steel Wire Products, Box 775, Connellsville, Pa.



Features: Made of firm, smooth, 1-piece welded high tensile steel. Deck is of 2" x 2" electrically welded No. 2 gage wire mesh with a No. 0 gage around the edges. Ample room provided vertically and horizontally for 8-way approach of fork lifting equipment. Impact test: withstands 1 ton, 8 ft drop; working load (sling): 8000 lbs; static loading: over 17,000 lbs.

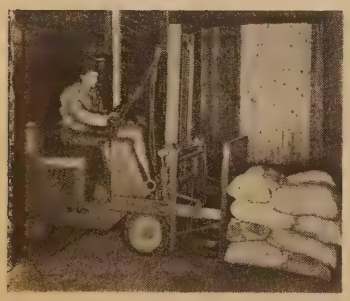
JANUARY, 1947

PEP 11

UNLOADER

Selection Board's Opinion: Versatile uses.

Manufacturer: Towmotor Corp., 1226 E. 152nd St., Cleveland, Ohio.



Features: Makes possible virtually complete unloading of box cars automatic. The unloader is operated by the driver from his regular position. Loading costs can be cut about 50%.

JANUARY, 1947

PEP 12

SHOP TRUCK

Selection Board's Opinion: Heavy duty.

Manufacturer: The Buda Co., 154th & Commercial Sts., Harvey, Ill.

Features: Large, non-skid deck with loading space of over 20 sq ft. Has dual wheels to carry extra heavy loads. Equipped with 7.7 hp, engine capable of speed up to 15 mph. Gas consumption: 35 to 40 miles per gal.

JANUARY, 1947

PEP 13

LIGHTWEIGHT CONVEYOR

Selection Board's Opinion: Handy and lightweight design.

Manufacturer: Material Movement Industries Conveyor Co., 310 S. Michigan Ave., Chicago 4, Ill.

Features: Of superior portability, the 12 foot conveyor model weighs only 135 lbs (without motor). It is made of special alloy steel and is corrosion and abrasion resistant. Two lengths available; 12 ft and 16 ft. Both models have 8" belt. Power furnished by a gasoline engine, mounted above conveyor away from dust, dirt and spillage.

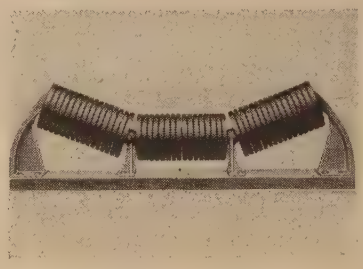
JANUARY, 1947

PEP 14

TROUGHING IDLER FOR BELT CONVEYORS

Selection Board's Opinion: Tends to reduce rupture stresses in belt.

Manufacturer: Chain Belt Co., 1600 W. Bruce St., Milwaukee 4, Wis.



Features: Use of idler under loading point will lengthen life of conveyor belt. Each roll consists of a rubber cylinder vulcanized directly to the assembly tube. The cylinder has multiple grooves moulded into it—deep primary grooves for maximum cushioning against belt carcass rupture, and shallow grooves to give softness for protection against belt cover laceration.

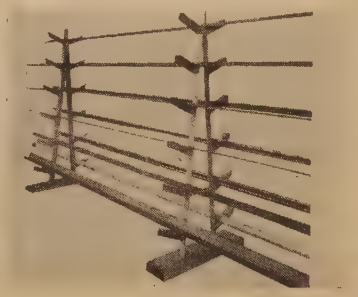
JANUARY, 1947

PEP 15

STEEL RACKS

Selection Board's Opinion: Strong but light in weight.

Manufacturer: Massey Machine Co., 800 Pearl St., Watertown, N. Y.



Features: All steel welded construction provides strength, flanges on arms provide convenient place for size markings, angularity of arms provides safety. Four types with carrying capacity of each type 6000 lbs., 4000 lbs., 3000 lbs., and 200 lbs., and weight of each rack 120 lbs., 90 lbs., 80 lbs., 65 lbs. respectively. Will facilitate stocking of bars, pipe, tubing, etc.

JANUARY, 1947

PEP 16

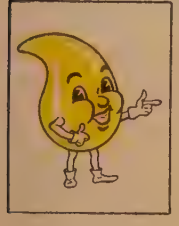
JACK KNIFE GRAVITY CONVEYOR

Selection Board's Opinion: Varying of elevation is unique.

Manufacturer: Island Equipment Corp., 101 Park Ave., New York.

Features: This light duty gravity assembled unit (where the legs and conveyor itself are one) can be instantly rolled to any job and adjusted to any desired height from floor area. The latter quality is possible because legs can, like a jack knife, be raised or lowered from 6" to 52" height by mere loosening of 2 wing bolts.

• Continued on page 182



It is a fact that certain Shell *greases* for high-speed bearings are more fluid than heavy grades of lubricating *oil* . . . and that other Shell greases are solid "block" lubricants that are sliced up in bricks to be placed in the journals of heavy machinery.

It is also a fact that fluidity is just one of the factors a Shell Lubrication Engineer takes into account when he selects lubricants for your equipment. His stock in trade is a lubricant to meet your every need . . . his function is to select the right one for each job.

From his experience, the Shell Lubrication Engineer can help you when something's wrong and needs quick attention—and he can help prevent trouble by analyzing your equipment right now to see that you are getting the benefit of all that's new in lubrication.

Call him any time. He's a good man to know.

SHELL

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100 Bush Street, San Francisco 6, California

• Continued from page 180

JANUARY, 1947

PEP 17

SMALL PARTS ASSORTER

Selection Board's Opinion: Small and compact design.

Manufacturer: Diagraph—Bradley Stencil Machine Corp., 3746 Forest Park, St. Louis, Mo.

Features: Consists of a number of compartmented trays set in a ferris wheel arrangement. It can be fastened in an upright position, from a side wall, or from the ceiling, and operates effectively in all positions. Two model sizes: 18" long x 12" high (handles 65 small parts); 12" long x 12" high (handles over 30 parts).

JANUARY, 1947

PEP 18

LOADING BRIDGE

Selection Board's Opinion: Safe to use.

Manufacturer: Craig-Holden Associates, Box 866, Fort Worth, Texas.

Features: Has positive locking device, side guards, non-skid surface, with beveled edge for easy entry. High quality steel is used throughout in the construction.

JANUARY, 1947

PEP 19

RUBBER TIRED STEEL WHEELS

Selection Board's Opinion: Eliminate necessity of axle.

Manufacturer: The Palmer Mfg. Co., 8115 Clinton Rd., Cleveland, Ohio.

Features Designed for general utility industrial use these wheels will carry vertical loads of over 1000 lbs. A special feature is the patented wheel mounting device which employs no cross axle and therefore does not limit width or stability in vehicle design. Come in 8" and 5½" diameters.

JANUARY, 1947

PEP 20

LOAD CART

Selection Board's Opinion: Many new and useful features.

Manufacturer: The Market Forge Co., 78 Garvey St., Everett 49, Mass.

Features: Useful for handling coal, cement, steel stampings, etc., as the height of truck from ground makes it convenient to handle materials in and out. The drop side may be locked in closed, half-open, or fully opened position. Wheels may be furnished in pneumatic, semi-steel or cushion rubber. Capacity of truck is approximately 1000 lbs.

JANUARY, 1947

PEP 21

CLAMP TRUCKS

Selection Board's Opinion: Tripping arrangement is good.

Manufacturer: Food Machinery Corp., Riverside, Cal.

Features: One-man clamp trucks that solve problems of in-play delay in moving materials. At the base of these trucks are short, powerfully tipped arms that squeeze with such strength that they can lift a loaded box from 300 to 600 lbs. The squeeze is applied by the operator as he steps on a pedal, eliminating the need of a helper.

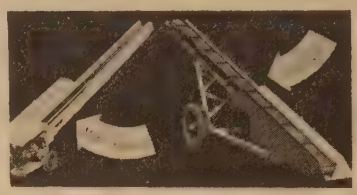
JANUARY, 1947

PEP 22

SELF-POWERED CONVEYORS

Selection Board's Opinion: Portable and light in weight.

Manufacturer: Bosworth Engineering Co., 6723 Denison Ave., Cleveland 2, Ohio.



Features: Are diversified in their use and will handle equally well materials in foundries, refractory plants, sand, gravel, cartons, or almost any item. Of lightweight construction, they will discharge materials up to 6' in height. Capacities of the standard models range from 40 to 75 tons per hour. Source of power is optional depending on where conveyors are used are local source for motor power.

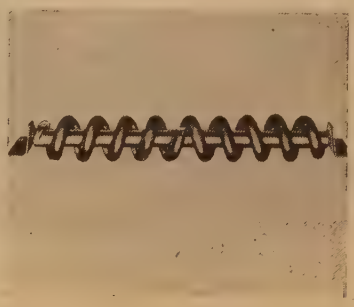
JANUARY, 1947

PEP 23

BELT CONVEYOR IDLER

Selection Board's Opinion: Eliminates ice formation when freezing temperature conditions prevail.

Manufacturer: Chain Belt Co., 1600 W. Bruce St., Milwaukee 4, Wis.



Features: Designed to combat faults when ordinary types of return idlers are used under conditions where freezing or ice formation on the rolls or high abrasive wear is a problem. The return idler is built of a flat-bar steel helical spiral covered with rubber. The idler retards ice formation because of rubber to rubber contact and loosening of ice formed by ever changing point of contact between the idler and conveyor belt.

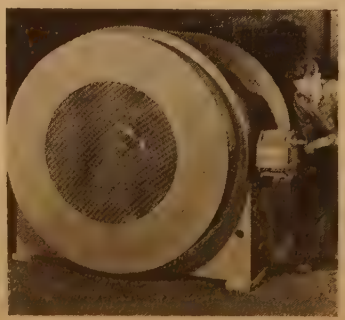
JANUARY, 1947

PEP 24

WEATHERPROOF MOTORS

Selection Board's Opinion: Large capacity units well protected.

Manufacturer: Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.



Features: A complete line of outdoor weatherproof, totally enclosed motors in the larger sizes ranging up to and above 2000 hp. In the ventilation heat transfer system, all air passages are practically self-cleaning and pockets in which water or liquid might be trapped have been eliminated.

• Continued on page 184

Thermoid —For Progress in American Industry

Bulk Materials Handling in 1872. Getting coal from barge to coal yard involved tedious hand shoveling, team and teamster, derrick, pulleys, tracks, counterweights and a great deal of time.

Modern Methods with Thermoid. Sand, gravel, crushed stone, coal—any kind of bulk material is speedily and effortlessly moved from pit, mine, ship or storage bin with loading machinery equipped with durable Thermoid belting.

IN most large-scale production plants mechanical transportation of materials in process is replacing costly, cumbersome, laborious manual methods. The result: greater production, better working conditions, fewer accidents, reduced costs.

In outdoor extractive industries and in factories, Thermoid has contributed to this progress through the development of conveyor belting to meet the special requirements of different companies. Consultation with a Thermoid representative may develop ways to help you improve processes and reduce costs.

Since 1880, in problems involving hose, belting and friction materials, industrialists have found *it's good business to do business with Thermoid.*

THE THERMOID LINE INCLUDES: Transmission Belting • V-Belts and Drives • Conveyor Belting • Elevator Belting • Wrapped and Molded Hose • Sheet Packings • Industrial Brake Linings and Friction Products • Molded Hard Rubber and Plastic Products.

Thermoid Rubber

DIVISION OF THERMOID COMPANY

TRENTON 6, NEW JERSEY

Contributor to Industrial Advancement Since 1880

• Continued from page 182

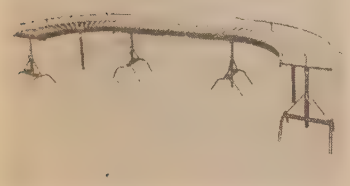
JANUARY, 1947

PEP 25

ROLLER GRAVITY CONVEYOR

Selection Board's Opinion: Effective in moving irregular surfaced materials.

Manufacturer: The Rapids-Standard Co., Inc., 308 Peoples National Bk. Bldg., Grand Rapids 2, Mich.



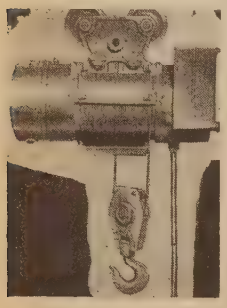
Features: A medium-duty classification standardized conveyor, it solves handling problems, when materials with insufficient flat area cannot be moved by wheel type gravity conveyors. These would include, for example, cans with chimes, kegs, light drums, steel bars, etc. Standard lengths: 5 & 8 ft. in standard widths of 12 and 18 inches.

JANUARY, 1947

PEP 26

ELECTRIC CABLE HOIST

Selection Board's Opinion: Light, small with ample capacity.
Manufacturer: Lisbon Hoist and Crane Co., Lisbon, Ohio.



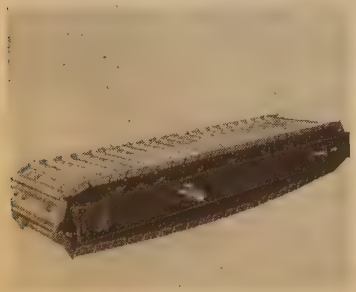
Features: Of revolutionary design, this hoist is half the weight of other cranes of same capacity. This makes it convenient in erecting or removing. It is made practically in 3 sections, permitting complete and easy access to any part by removal of about 4 bolts. Ball bearing throughout, gears are made of treated alloy steel.

JANUARY, 1947

PEP 27

APRON CONVEYOR

Selection Board's Opinion: A stock design with many applications.
Manufacturer: Chain Belt Co., 1600 W. Bruce St., Milwaukee 4, Wis.



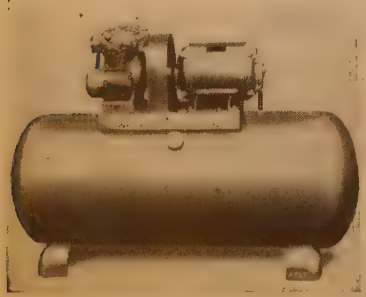
Features: Heavy duty roller supported apron feeder is furnished in several widths, with centers ranging from 4'7" to maximum of 9'1" varied by 18 increments. At normal speed of 10 fpm., handling 100# material, capacities of units will run to 80 tons per hr.

JANUARY, 1947

PEP 28

AIR COMPRESSORS

Selection Board's Opinion: Self-contained units.
Manufacturer: Worthington Pump and Machinery Corp., Harrison, N. J.



Features: The line includes single-stage and two-stage sizes for pressures up to 250 psi for mating to motors of 1 to 15 h.p. Arrangements include self-contained power driven models mounted on bases or tanks as well as bare compressors for either direct or V belt connections to drivers. A centrifugal clutch permits the driving motor to attain full speed before the compressor turns, eliminating need for starting unloaders, check valves, etc.

JANUARY, 1947

PEP 29

FLEXIBLE METALLIC PACKING

Selection Board's Opinion: Strong and resistant.
Manufacturer: Raybestos-Manhattan, Inc., Manheim, Pa.

Features: Packing is for steam and air rods, centrifugal pump shafts, expansion joints, etc., where the temperatures do not exceed 450 degrees F. or surface speed is not greater than 600' per minute. It is a resilient flexible metallic packing incorporating a cross sectional composition of non-frictional metallic foil-combined with asbestos yarn, temperature resistant lubricants, and flake graphite for sealing and reducing friction.

JANUARY, 1947

PEP 30

LIFTING DUMPER AND TRANSFER TABLE

Selection Board's Opinion: Handy for many applications.
Manufacturer: Lewis-Shepard Products Inc., 248 Walnut St., Watertown, Mass.

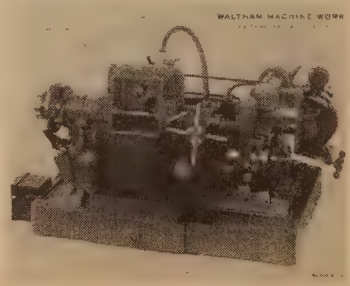
Features: A multi-purpose labor saving dump truck can be used in its lowered position, with the flat table top in place, as a turtle table, transfer table, or work bench. Removal of table top converts truck into a bin truck. Dumping takes place automatically by lifting bin hydraulically by means of pedal. Bin capacity: 3¾ cu. feet. Weight handled: 1000 lbs.

JANUARY, 1947

PEP 31

PINION AND GEAR CUTTING MACHINE

Selection Board's Opinion: Single cutter machine of high precision.
Manufacturer: Waltham Machine Works, Waltham, Mass.



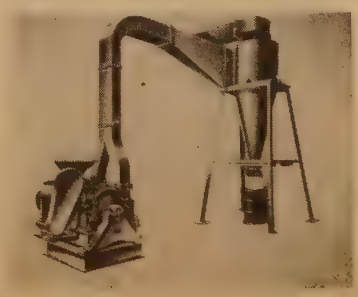
Features: Has capacity up to 2¼" pitch diameter with 2" length of cut. It is a single cutter machine, with the revolving cutter making successive cuts on blanks held and indexed by the work spindle and supported by tail center. Only straight teeth can be cut. Unless otherwise called for, a 120 division index is furnished with this machine.

JANUARY, 1947

PEP 32

MICRO-ATOMIZER

Selection Board's Opinion: Large size.
Manufacturer: Pulverizing Machinery Co., Chatham Road, Summit, N. J.



Features: Using a 75 hp. motor this mechanical screenless pulverizer is particularly applicable to tonnage operations. Capacities in range of 2,000 to 8,000 lbs. per hour, depending on material being ground. Approximate dimensions of machine proper (without cyclone or piping) are 8' x 7' x 5½'.

• Continued on page 186

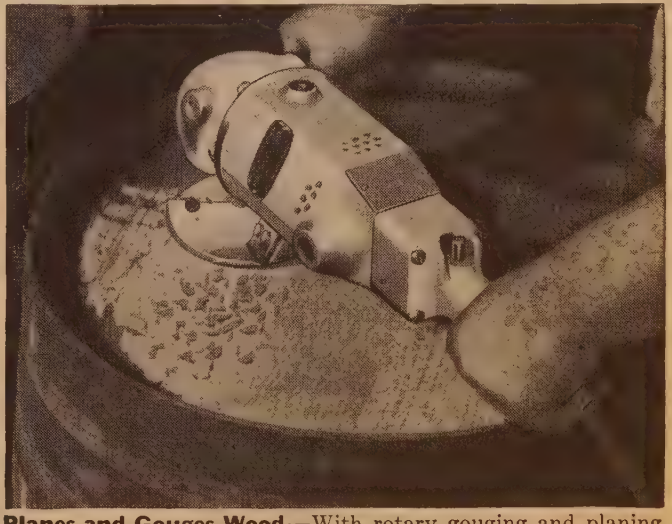
Black & Decker Sanders Speed Up Many Surfacing Jobs

Speeds Wire Brushing—With "Whirlwind"* Wire Cup Brushes, the Sander takes off old paint, rust, scale . . . cleans castings, tanks, boilers, vats, sheet metal and soldered joints.

*Trade Mark Reg. U. S. Pat. Off.

Sands Any Surface—With abrasive discs, a Black & Decker Portable Electric Sander speeds up sanding of any surface from fast metal removal to satin-smooth finishing.

Grinds Any Metal—With saucer or cup-type grinding wheels, the Black & Decker Sander removes metal; smooths welds and casting ridges; grinds off old rivets, studs and bolts; sharpens stationary machine blades.



Planes and Gouges Wood—With rotary gouging and planing heads, it shapes and semi-finishes lumber, working faster than jack plane and adz . . . removes stencil and brand marks from barrels and boxes.

See Your Black & Decker Distributor for helpful information on Sanders, Grinders, Drills, Saws and many other Portable Electric Tools for production, construction, maintenance and repair. For your free copy of our complete catalog, write today to: The Black & Decker Mfg. Co., 618 Pennsylvania Ave., Towson 4, Maryland.

LEADING DISTRIBUTORS EVERYWHERE SELL

Black & Decker

PORTABLE ELECTRIC TOOLS

• Continued from page 184

JANUARY, 1947

PEP 33

LIFT TRUCKS

Selection Board's Opinion: Greatly facilitates handling of heavy loads.
Manufacturer: Barrett-Cravens Co., 3255 W. 30th St., Chicago 23, Ill.

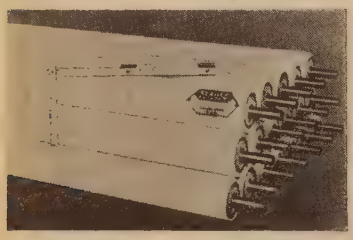
Features: Electric drive and electric lift enables any operator—even women—to handle loads of 4000 to 6000 lbs. Motor and jackshaft supported on precision ball bearings, sealed and lubricated for life. Full vertical lift accomplished in 4 seconds.

JANUARY, 1947

PEP 34

WOOD WINDER ROLLS

Selection Board's Opinion: Lightweight and long lasting.
Manufacturer: Rodney Hunt Machine Co., Orange, Mass.



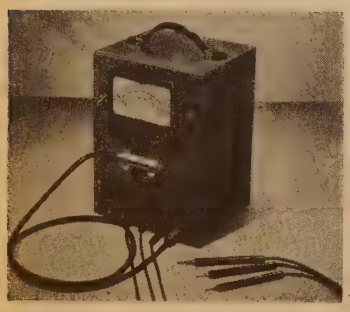
Features: Two types: One has the shaft anchored to the wood, the other has a simple countersink in the end of the wood, reinforcing and strengthening the shaft. Specially selected lightweight, well seasoned wood is used for both rolls. Diameters of 3½" and 4½" are standard, though other sizes are available.

JANUARY, 1947

PEP 35

TESTER FOR RADIO AND ELECTRONIC CIRCUITS

Selection Board's Opinion: Simplifies circuit testing.
Manufacturer: Sylvania Electric Products Inc., 500 Fifth Ave., New York 18, N. Y.



Features: Designed for accurate measurement of electrical conditions in circuit components operating with power, audio and radio frequencies up to 300 mc., this instrument permits repairmen to quickly isolate condensers, coils and resistors when faults occur. This midget, thumb size probe utilizes a type 1247 proximity fuse type tube.

JANUARY, 1947

PEP 36

UNIT SUBSTATIONS

Selection Board's Opinion: Complete unit.
Manufacturer: Wagner Electric Corp., 6400 Plymouth Ave., St. Louis 14, Mo.

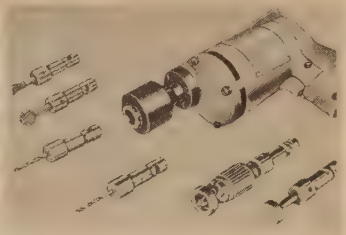
Features: High voltage incoming line, transformer, and low voltage feeder sections are combined in one compact assembly in these unit substations. Installation is simple. They are standardized in ratings 100, 150, 200, and 300 KVA, 3 phase, 60 cycles.

JANUARY, 1947

PEP 37

HIGH SPEED PRODUCTION CHUCK

Selection Board's Opinion: Enables quick tool changes to be made.
Manufacturer: Rayco Mfg. Co., Chicago 15, Ill.



Features: A chuck for drill presses and hand power tools which permits quick tool changes with ease and safety without shutting off the power tool. Using the principle of centrifugal force to move a ground and hardened driver into the adapter slot, the chuck operates in all positions at any speed. Tool changes can be made in 3 seconds with the power tool operating up to 20,000 rpm.

JANUARY, 1947

PEP 38

HIGH SPEED ELECTRIC HAND TOOL

Selection Board's Opinion: Small and easy to use.
Manufacturer: Precise Products Co., 1328-30 Clark St., Racine, Wisc.

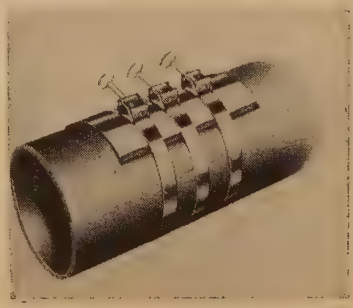
Features: This portable grinder has 1/5 hp. and speeds up to 40,000 rpm. for grinding, milling, drilling, finishing and polishing of metals, plastics, glass, etc. Cased in high-impact plastic, tool weight is 40 oz. A precision quill mounts collet chuck or grinding wheel arbors of various sizes; push button spindle lock for quick tool change.

JANUARY, 1947

PEP 39

PIPE-LEAK CLAMP

Selection Board's Opinion: Fits many diameters.
Manufacturer: Marman Products Co., Inc., 940 W. Redondo Blvd., Inglewood, Cal.



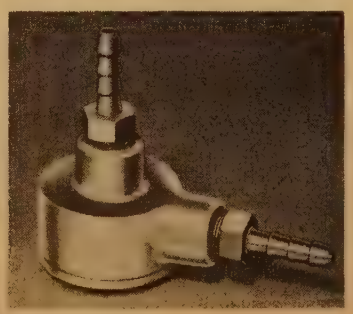
Features: The all-stainless steel clamp consists of a Hycar pad, resistant to water, gas, oil, gasoline, etc. An annealed backing plate covers the pad and can be hand-formed to any type contour. Pad and patch plate are secured over lead with stainless steel clamps of the continuous band type which have a range in size from 9/16" up to the maximum diameter for clamp.

JANUARY, 1947

PEP 40

EXHAUST VALVE

Selection Board's Opinion: A quick acting valve.
Manufacturer: Mead Specialties Co., 4114 N. Knox Ave., Chicago 41, Ill.



Features: For use with pneumatic cylinders, this compact unit automatically opens as soon as the air is shut off, thus materially speeding up the return stroke of the air cylinder. It can be directly attached to air cylinders with a ¼" pipenipple or cut into the air hose adjacent to the cylinder. Body diameter: 1¾"; height, 1½"; length: 2¼". Both nipple openings tapped ¼" N.P.S.

JANUARY, 1947
PEP 41

CLOSE CLEARANCE GRAB

Selection Board's Opinion: Expedites safe handling.

Manufacturer: The American MonoRail Co., 13107 Athens Ave., Cleveland 7, Ohio.

Features: Designed to speed up safe handling of long narrow wooden boxes, this grab is operated from a single hoist hook. The gripper jaws are pulled together parallel to the load by the plow steel cable threaded around the sheaves. Loads up to 1000 lbs. are held securely. Boxes as long as 20 ft. and with a width varying from 17" maximum to 6" minimum can be quickly moved. Narrow jaws allow spotting of unwieldly boxes with minimum of lost motion.

JANUARY, 1947
PEP 42

HYDRAULIC JACKS

Selection Board's Opinion: High capacity and easy to use.

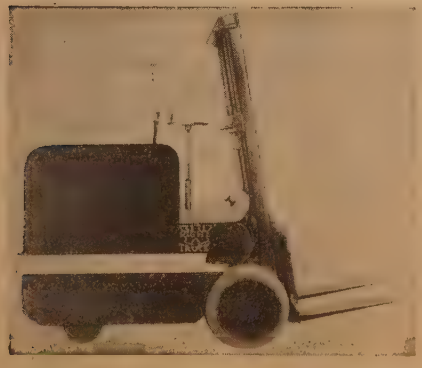
Manufacturer: Duff-Norton Mfg. Co., Pittsburgh, Pa.

Features: Available in 3 to 50 ton capacities. All 3 to 12-ton models are equipped with extension screws which can be quickly hand raised to load height. The 20 to 50-ton models have fast working dual pumps.

JANUARY, 1947
PEP 43

TILTING FORK TRUCK

Selection Board's Opinion: Convenient and easy operation of levers.

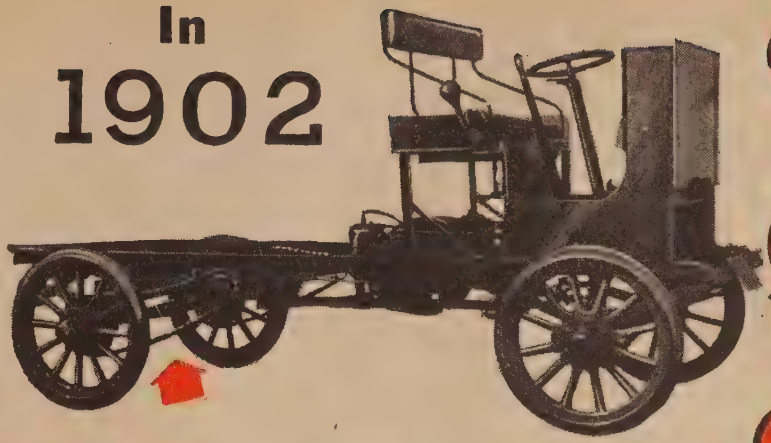


Manufacturer: Wright Hibbard Industrial Electric Truck Co., Phelps, N.Y.

Features: This 2000 lb capacity, battery

(Continued on page 188)

In 1902



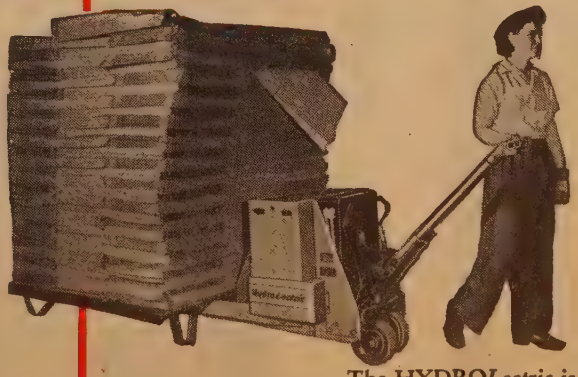
45 YEARS AGO
chain drives were modern
. . . but not in your LIFT TRUCK
today

If you judge a lift truck by 1902 standards, a chain drive for propulsion or horizontal travel might suffice. Strangely enough, some lift trucks are still made with old-fashioned chain drives. But 1902 standards just won't do for 1947!

That's why we equip the HYDRO*Lectric* with a fully enclosed *gear drive*. As a result, the powerful, *completely modern* HYDRO-*Lectric* is free from the excessive "drag", noisy operation, breakage and other difficulties peculiar to chain drive mechanisms.

The gear-driven HYDRO*Lectric* has far greater efficiency and dependability. Downtime is less, maintenance cost decidedly lower. Superior advantages of the HYDRO*Lectric's* enclosed gear drive are apparent on every operation—and particularly where abrasive materials easily attack and damage an exposed chain drive.

The Motorized
HydroLectric
. . . with Enclosed Positive Gear Drive



Responds instantly to patented "Finger-Tip" Control, moving loads forward or backward at the mere pressing of a button! Has 4 wheels for stability, gear drive to load wheel. Speeds handling tremendously . . . cuts handling cost up to 75% . . . pays for itself 5 and more times a year!

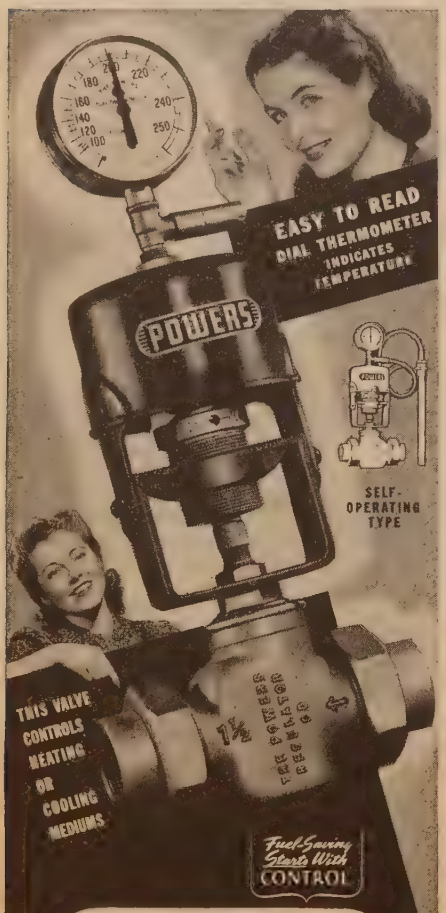
The HYDRO*Lectric* is engineered by the Stuebings, pioneers in lift truck construction since 1910. Write today for Bulletin "K" giving complete details, including prices and list of nationally known users.

LIFT TRUCKS INC. W.W.W. STUEBING CINCINNATI

LIFT TRUCKS, INC.
Walter Stuebing, President
2425 Spring Grove Ave. Cincinnati 14, Ohio

Economize WITH POWERS

TEMPERATURE REGULATORS



Use a Powers No. 11 Temperature Indicating Regulator when you want the advantages of an easy-to-read dial thermometer combined with a dependable self-operating regulator. The dial thermometer gives a visual check on the performance of the regulator and makes it easy to adjust for the required operating temperature. Various dials and ranges are available.

Is Easy To Install—because both the thermometer and the regulator operate from the same thermal system—only one tapped opening is required.

Write for Circular 2511

THE POWERS REGULATOR CO.
2758 Greenview Avenue, Chicago 14, Illinois
231 E. 46th St., New York 17, N. Y.—Offices in 47 Cities . . . See your phone directory.
70

OVER 50 YEARS
OF AUTOMATIC TEMPERATURE AND HUMIDITY CONTROL

Plant Equipment Previews

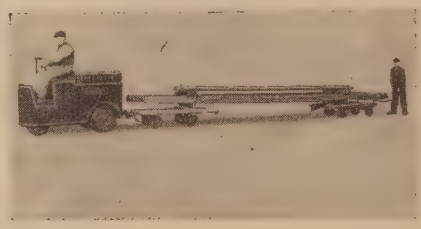
(Continued from page 187)

powered model has front wheel drive, rear wheel steer, center control, hydraulic foot brakes and mechanical emergency brakes in front drive wheels. Has hydraulic lift and tilt system—forks can be raised 108 ft from floor. Safety control lever and lift motor levers operating hydraulic system are operated independently or at same time.

JANUARY, 1947
PEP 44

LONG LOAD HANDLER

Selection Board's Opinion: Solves a difficult problem.



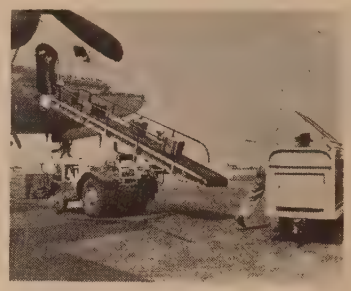
Manufacturer: The Mercury Mfg. Co., 4122 S. Halsted St., Chicago 9, Ill.

Features: A swivel bolster consisting of 2 identical assemblies, each of which may be attached to single castor steer trailer simplifies problem of adjusting regular equipment to carry loads of extra length. Supported by these bolster assemblies, unwieldly cargoes may be moved through confined spaces by having lead trailer pulled by a power vehicle and the rear trailer guided manually.

JANUARY, 1947
PEP 45

CARGO CONVEYOR

Selection Board's Opinion: Portable with many possible applications.



Manufacturer: Mercer Robinson Co., Inc., 30 Church St., New York 17, N. Y.

Features: Can be used for loading and conveying. It is 22′ long and has a 20″ wide crepe rubber belt which can travel in both directions. The belt which travels at 60′ per minute will carry a distributed load of 1000 lbs. Operation of the conveyor is hydraulic.

JANUARY, 1947
PEP 46

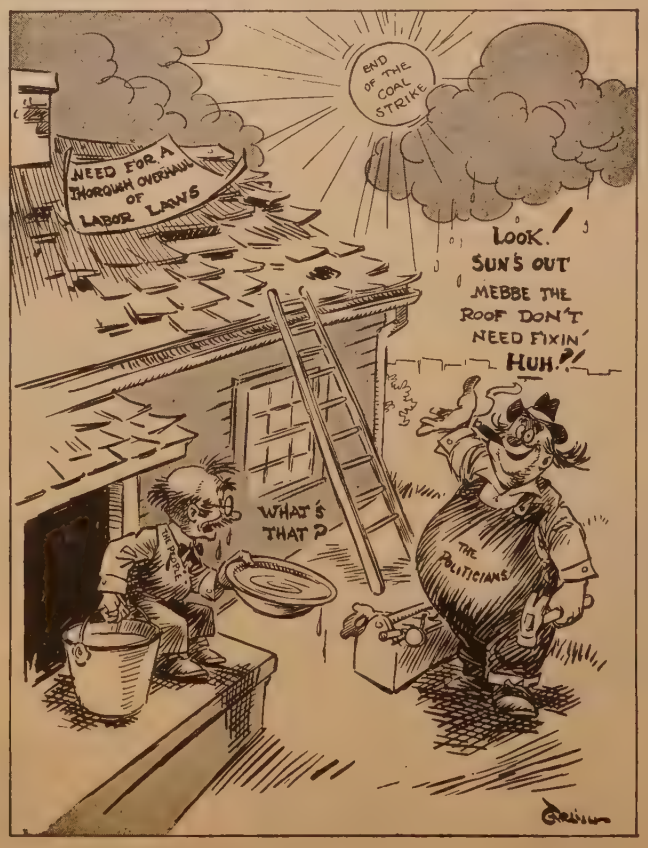
BUCKET ELEVATOR

Selection Board's Opinion: Delicate handling is feature.

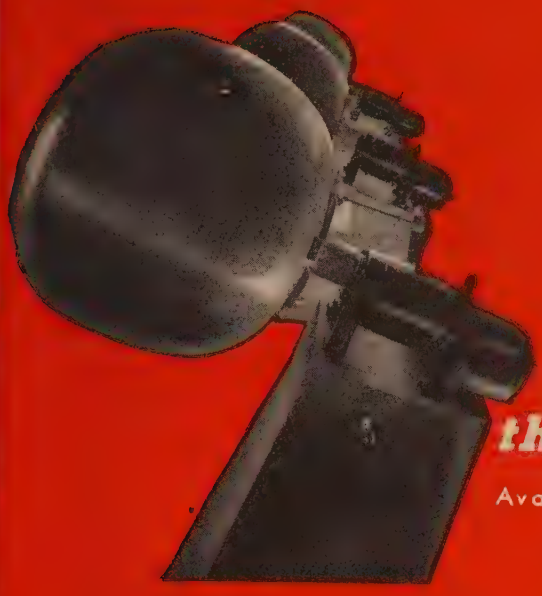
Manufacturer: Link-Belt Company, 307 N. Michigan Ave., Chicago 1, Ill.

Features: An internally loaded, loop-type bucket elevator, particularly suited to the

(Continued on page 190)

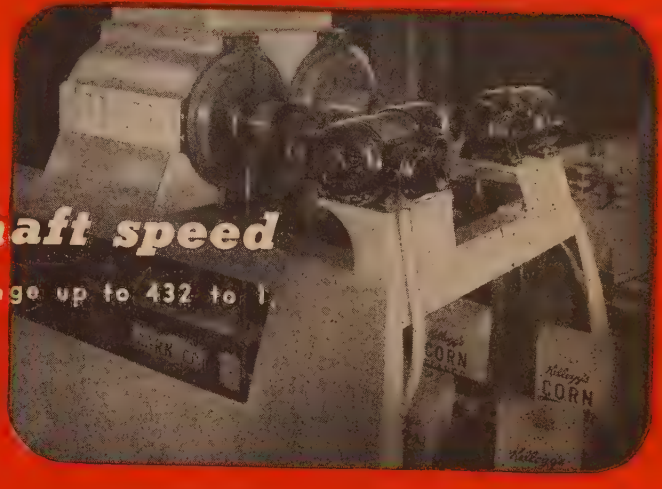

END OF THE COAL STRIKE
NEED FOR A THORUAH OVERHAUL OF LABOR LAWS
LOOK! SUN'S OUT MEBBE THE ROOF DON'T NEED FIXIN' HUH?!
WHAT'S THAT?
THE POLITICIANS

Copyright, 1946, New York Tribune, Inc.



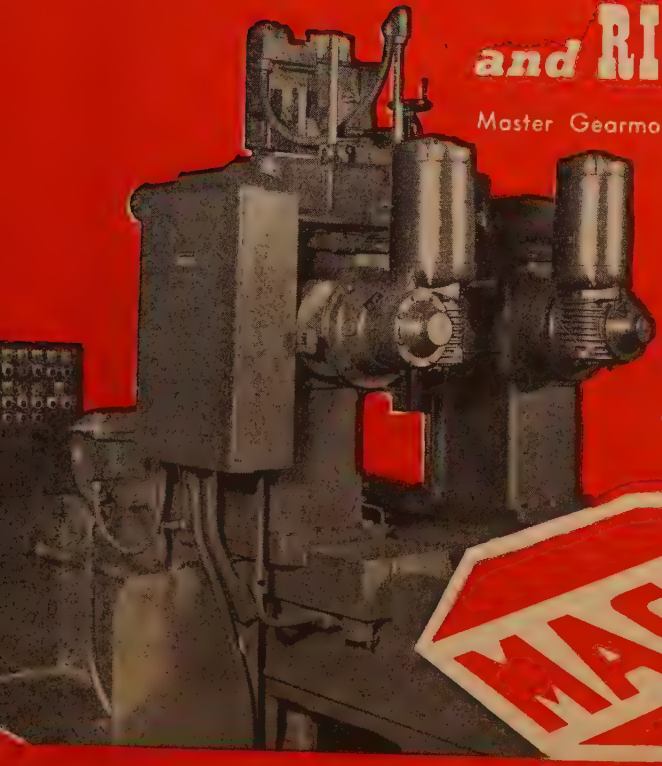
the RIGHT horsepower

Available in sizes from 1/10 to 100 horsepower.



the RIGHT shaft speed

Gear reduction ratios range up to 432 to 1.



and RIGHT where you want it

Master Gearmotors, available in millions on millions of combinations of types and ratings, permit you to use a power drive on each job that's just right . . . a power drive that will add greatly to the compactness, appearance, and economy of each of your applications. Use Master Gearmotors to increase the salability of your motor-driven products . . . improve the economy, safety, and productivity of your plant equipment.

MASTER GEARMOTORS

THE MASTER ELECTRIC COMPANY • DAYTON 1, OHIO

For Utmost Precision...

...use Desmond Diamond Tools

THE PLAIN FACT that Desmond makes the only complete line of grinding wheel dressing and truing tools is reason enough for specifying Desmond for all your dressing requirements. But there are other good reasons, too. Take diamond tools. We select rough diamonds with expert care, mount them (in hand tools or nibs) with hard-earned know-how, and *stand behind every single one.*

Fasten your Desmond diamond tools securely in the tool post or holder . . . with the tool axis at an angle of 10 to 15 degrees with respect to the radius . . . and turn the tool frequently to present a new diamond point. As a rule large diamonds run cooler and *do more work per dollar* than small ones.

Write for your copy of the Desmond Catalog No. 45 today. It will help you pick the right tool for the job—and get the most out of it.

THE DESMOND-STEPHAN MFG. CO., URBANA, OHIO

Desmond

the only complete line of grinding wheel

DRESSERS & CUTTERS

BALL BEARING DRESSERS | REVOLVING CUTTER TYPE DRESSERS | DIAMOND HAND TOOLS AND NIBS | WHEEL TYPE DRESSERS | SIMPLEX STEEL-SLIDE VISE

Plant Equipment Previews

(Continued from page 188)

gentle handling of delicate, relatively small manufactured parts through a generally upward direction. It can be loaded on both sides either by chute or conveyor and can be discharged at top to either side through a rubber-lined chute or directly to a conveyor extending under the bucket line.

JANUARY, 1947
PEP 47

INDUSTRIAL TRUCK BATTERY CHARGER

Selection Board's Opinion: Automatic stop and start a good quality.

Manufacturer: Hobart Brothers Co., Box M, PD 42, Troy, Ohio.

Features: For direct current charging of motorized lift truck batteries in either lead acid or nickel iron types. Generator is 15-16 volt, d-c, 50 amp. ¾ KW diverter pole type with a 3 phase, a-c 220/440 volt, 60 cycle, 1½ hp squirrel cage induction ball bearing motor. Setting of interval timer automatically shuts down machine at end of pre-set charging time.

JANUARY, 1947
PEP 48

TREAD-LOCK WHEEL

Selection Board's Opinion: Designed for heavy duty.

Manufacturer: Thermoid-Grizzly Wheel Sales Div., Thermoid Co., Wrigley Bldg., Chicago, Ill.

Features: Stands up under terrific impact, heavy loads, and abrasive surfaces. Patented

(Continued on page 195)

Plant Equipment Previews

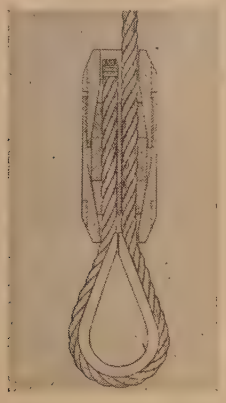
(Continued from page 190)

"Sealed in Lubrication" gives automatic life-long lubrication to sealed precision-built bearings. Patented "breather holes" in casting allow the rubber tire to expand under pressure and contract as removed.

JANUARY, 1947
PEP 49

WIRE ROPE CLAMP

Selection Board's Opinion: Simplifies installation of thimbles, etc.



Manufacturer: Nunn Manufacturing Co., 2125 Dewey Ave., Evanston, Ill.

Features: Makes it possible to hold loads in excess of tensile strength of rope used. Made of alloy steel and cadmium plated for weather protection. All standard sizes from 1/16" to ¾". Easily assembled and disassembled by unskilled labor.

JANUARY, 1947
PEP 50

NEUTRALENE GAS PRODUCER

Selection Board's Opinion: Complete and portable assembly.

Manufacturer: General Electric Co., Schenectady, N. Y.

Features: Provides a neutral CO_2-free, dry, combusted gas for heat treating medium- and high-carbon steels without decarburization. The Neutralene gas atmosphere is especially suitable for bright annealing, clean hardening, and furnace brazing of high

(Continued on page 196)

REPUTATION . . .

IS QUALITY THROUGH THE YEARS

Quality is value insurance to the purchaser. Thus, reputation for quality is the sum total of countless thousands of full-value products and services, delivered uninterruptedly over a long period of years.

But to Behr-Manning, *lasting* reputation is more than time's stamp of approval for past performances. The needs of the future for progressively improved quality are to us a twofold challenge—a challenge in research and a challenge in methods engineering.

The first challenge is a stimulus to build ever better coated abrasives, which in turn will produce more units and finer finishes, faster, and at lower cost. The second is a crusade to bring to Industry's cost-stricken production lines the relief of lower-cost abrasive methods.

Dedicated to the accomplishment of these objectives, we enter our fourth quarter-century of quality and service to Industry.

BEHR-MANNING · TROY, N. Y.
(Division of Norton Company)

SAFE ★ ECONOMICAL

KEK

IS A STEAM-CONDITIONING AS WELL AS BOILER-CLEANING COMPOUND, used to increase the steaming qualities of high and low pressure boilers. By its use, more steam is generated to adequately heat all radiation. Stops hammering in the pipe line and radiators, water stays in the boiler, giving safety against dangers of cracked boiler sections. Peps up sluggish boilers... Removes scale from boiler tubes. MOST IMPORTANT . . . *KEK will reduce fuel consumption.*

KENITE BOILER REPAIR

is a concentrated metallic compound for repairing cracked sections of cast iron boilers. Seals from within by forcing the caulking compound into cracks, hardening therein under furnace heat. Odorless — Safe — Won't affect water. Permanently seals cracks and pin-holes. Not removed by subsequent cleaning.

KENBRIC SOOT REMOVER

Just toss a brick into the flame. Rids heating surfaces of insulating soot and tar residues. Slow-burning — Safe—Known and used by well-known plants.

KEK
REG. U.S. PAT. OFF.

DISTRIBUTORS: Territories open attractive basis. Investigate Kenite's time-tested, safe line of helpful chemical specialties.

KENITE LABORATORY, INC.
83 MURRAY ST., NEW YORK 7, N. Y.

Plant Equipment Previews

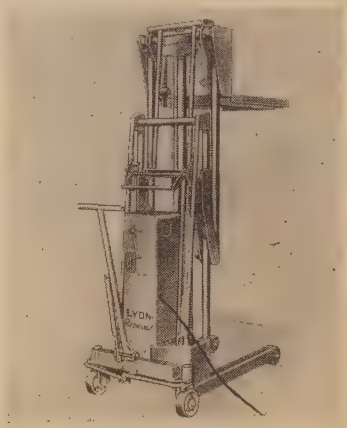
(Continued from page 195)

speed steels and sintering of high-carbon ferrous metals. The basic unit of the equipment is a complete, portable, assembly, mounted on a single base and interconnected with piping and wiring.

JANUARY, 1947
PEP 51

HYDRAULIC POWER UNIT

Selection Board's Opinion: Easy to use and of versatile application.



Manufacturer: Lyon-Raymond Corp., 2929 Madison St., Greene, N. Y.

Features: For stacking or tiering where speed of elevation is important for hydraulic high speed trucks. The power is compact and self-contained, consisting of electric motor, hydraulic gear type pump, valves, oil reservoir and necessary controls. Available with ½ hp or ¾ hp motor depending on speed of elevation required and capacity of truck.

JANUARY, 1947
PEP 52

CONVEYOR TROLLEY

Selection Board's Opinion: Simplified design with many possible applications.

Manufacturer: Link-Belt Co., 307 N. Michigan Ave., Chicago, Ill.

Features: A free-rolling conveyor trolley with no wheel shafts or spindles and not requiring separate retainers for its full complement of hardened, balanced, alloy steel balls. Two basic elements (wheel and one-piece bracket) form deep inner and outer races of the bearing. Inner bearing race revolves within outer race. Fixed points of pressure are on outer race resulting in greater resistance to wear. The outer bearing race and carrying attachment are included in single bracket resulting in fewer parts and simplifying assembly.

JANUARY, 1947
PEP 53

ROLLER CONVEYORS

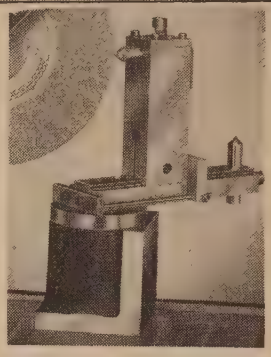
Selection Board's Opinion: Adaptable to many uses.

Manufacturer: Lyon Metal Products Inc., Aurora, Ill.

Features: A complete "packaged" line of

(Continued on page 198)

PRECISION DRESSING AT LOW COST



with the
"FORM-MASTER"*
ANGLE & RADIUS DRESSER

A sturdy, quality instrument for accurate dressing of both angles and radii at low cost. Easily set with micrometer for radii—and with protractor or sine-bar for angles. All parts (except base) hardened and ground to close tolerances. Sealed ball-bearings for long-life and accuracy. Two 1/3 ct. diamonds and case included—$150.00 complete.

COMPARE THESE FEATURES:
- Wide range
- Chatterless and dustproof
- .0001" accuracy obtainable
- Reasonably priced

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Write for complete information

J&S TOOL CO.
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Manufacturers of "Fluidmotion" Form Dressers

when you want Speed—
when you want power—

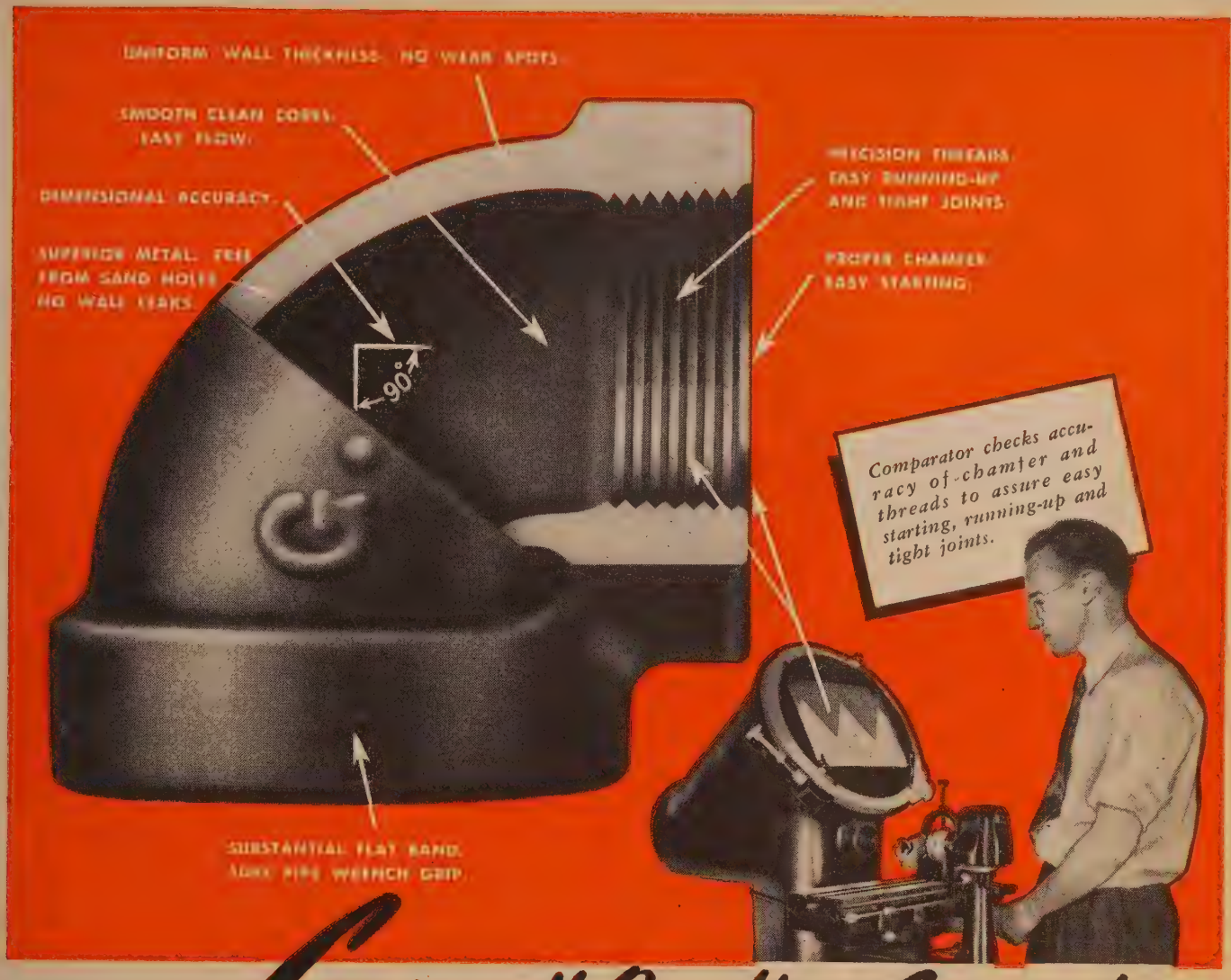
... in your job of grinding, polishing, buffing, sanding, drilling, reaming, screw-driving or nut-setting, you want a Strand Flexible Shaft machine, because a Strand will do it faster, better, and stand up to it longer.

Strand Flexible Shaft machines provide constant speeds with greater operator convenience. Hundreds of attachments easily interchanged—125 types and sizes—models include vertical and horizontal type machines from ⅛ to 3 h.p. Distributors in all principal cities.

Send today for catalog showing complete line

M-5

Strand
FLEXIBLE SHAFTS
N. A. STRAND & CO.
5013 NO. WOLCOTT AVE. CHICAGO 40, ILL.


UNIFORM WALL THICKNESS—NO WEAK SPOTS
SMOOTH CLEAN BORES—EASY FLOW
DIMENSIONAL ACCURACY
SUPERIOR METAL—FREE FROM SAND HOLES—NO WALL LEAKS
PRECISION THREADS—EASY RUNNING-UP AND TIGHT JOINTS
PROPER CHAMFER—EASY STARTING
90°
SUBSTANTIAL FLAT BAND—NON-SLIP WRENCH GRIP
Comparator checks accuracy of chamfer and threads to assure easy starting, running-up and tight joints.

Grinnell Quality Control

. . . EXTRA RELIABILITY IN PIPE FITTINGS AT NO EXTRA COST

From original material to final inspection, Grinnell Pipe Fittings are checked time and time again with modern testing equipment to assure leakproof, safe connections in your piping installations. The result is uniformly high quality fittings at no extra cost. Available through branch warehouses and jobbers everywhere. Write for Catalog 5-B. Grinnell Company, Inc., Executive Offices, Providence 1, Rhode Island.

Branch Warehouses

Atlanta 2, Ga.
Charlotte 1, N. C.
Chicago 9, Ill.
Cleveland 14, O.
Houston 1, Tex.
Kansas City, Mo.
Los Angeles 13, Cal.
Minneapolis 15, Minn.
New York 17, N. Y.
Oakland 7, Cal.
Philadelphia 34, Pa.
Providence 1, R. I.
Seattle 1, Wash.
St. Louis 10, Mo.
St. Paul, Minn.
Sacramento 14, Cal.
San Francisco 7, Cal.

GRINNELL for complete PIPING SERVICE

Manufacturers of . . .

- PIPE and TUBE FITTINGS
- ENGINEERED PIPE HANGERS
- PREFABRICATED PIPING
- SAUNDERS DIAPHRAGM VALVES
- THERMOLIER UNIT HEATERS
- JOB WORK CASTING
- AUTOMATIC SPRINKLERS and other FIRE PROTECTION SYSTEMS
- AMCO HUMIDIFICATION and COOLING SYSTEMS
- OTHER PIPING SPECIALTIES

Suppliers of . . .

- PIPE, VALVES and FITTINGS
- SPECIALTIES for PLUMBING, HEATING, WATER WORKS and GENERAL PIPING

GRINNELL

WHEREVER PIPING IS INVOLVED

Put speed, power and stamina into the hands of your workmen by equipping them with MallDrills. They penetrate metal, plastics and wood faster—leaving clean, accurate holes for bolts, rivets, studs, tapping or other uses. They will not stall under hand pressure . . . run cool under load . . . are compact in design for use in close quarters. Commutator can be serviced and brushes replaced without dismantling. There are five powerful models—¼" (two speeds), 5/16", ⅜", and ½"—each available for 110-volt AC-DC or 220-volt AC-DC.

Ask your Supplier or write Power Tool Division for literature.

MALL TOOL COMPANY
7705 SOUTH CHICAGO AVE., CHICAGO, ILLINOIS
25 Years of "Better Tools for Better Work"

MANY USES — BIG SAVINGS
WITH
CERRO LOW TEMPERATURE MELTING ALLOYS

CERROMATRIX—250° F. For securing punch and die parts; anchoring machine parts; short run forming dies, etc.

CERROBEND—158° F. As a filler for bending thin-walled tubing—melts out in boiling water. Also used for automotive and aircraft assembly jigs, forming dies, etc.

CERROSAFE—165° F. - 190° F. Used for proof-casting cavities in molds, forging dies, duplicate patterns, etc.

CERROBASE—255° F. Used in electroforming dies, molds, etc.

CERROTRU—281° F. Metal molds for wax patterns used to make precision castings.

CERROLOW—117° F.—**CERROLOW**—136° F. and **CERROLOW**—174° F.

REPRESENTATIVES & DISTRIBUTORS

ANSONIA, CONN.
L. Heroe De Wyk & Co.
80 Main St.

BOSTON 16, MASS.
Robert P. Waller,
90 Boylston St.

BROOKLYN 7, N. Y.
Belmont Smelting & Refining Works
830 Belmont Ave.

CHICAGO, ILL.
Sterling Products Co., Inc.
121 N. Jefferson St.

CLEVELAND 14, OHIO
Die Supply Co.
5345 St. Clair Ave.

DETROIT 17, MICH.
Castaloy Metal Sales Co.
107 S. Waterman Ave.

DALLAS, TEXAS
Metal Goods Corporation
2500 S. Ervay

HOUSTON 1, TEXAS
Metal Goods Corp.
16 Drennan St.

KANSAS CITY 8, MO.
Metal Goods Corp.
1701 Baltimore

LOS ANGELES, CALIF.
Composite Die Supply Co.
1855 Industrial St.

MILWAUKEE, WISC.
Williams-Collins, Inc.
2409 State St., W.

MINNEAPOLIS 1, MINN.
Northern Machinery & Supply Co.
Lumber Exchange Bldg.

MOLINE, ILL.
Sterling Products Co.
1524 Third St.

NEW ORLEANS, LA.
Metal Goods Corp.
413 Canal Bldg.

NEW YORK 5, N. Y.
Belmont Smelting & Refining Wks.,
Cerro-Alloy Div.
37 Wall St.

PHILADELPHIA 2, PA.
Jackson-Walter Co.
152 N. 15th St.

ST. LOUIS 15, MO.
Metal Goods Corp.
5239 Brown Ave.

TULSA 6, OKLA.
Metal Goods Corp.
19 E. Cameron

TORONTO 8, ONT.
The Canada Metal Co.
721 Eastern Ave.

CERRO DE PASCO COPPER CORPORATION
40 WALL ST. NEW YORK 5, N. Y.

Plant Equipment Previews

(Continued from page 196)

gravity rollers. Available in 3 sizes: 3 straight sections all 10′ long and in 3 widths, 12", 18" and 24"; three 90° curved sections, 12", 18" and 24" wide; 2 trestles 18" and 24" wide.

JANUARY, 1947
PEP 54

PORTABLE CARRIER

Selection Board's Opinion: Handles are desirable feature.

Manufacturer: Bordeaux Engineering Co., 649 South Olive St., Los Angeles 14, Calif.

Features: Carrier for heavy drums and barrels is easily manipulated by one man. Handles on carrier provide ease of operation. Needless handling, lifting or changing of position is eliminated.

JANUARY, 1947
PEP 55

SWIVEL JOINT

Selection Board's Opinion: High pressure, tight joint.

Manufacturer: Chiksan Company, 332 Pomona Ave., Brea, Cal.

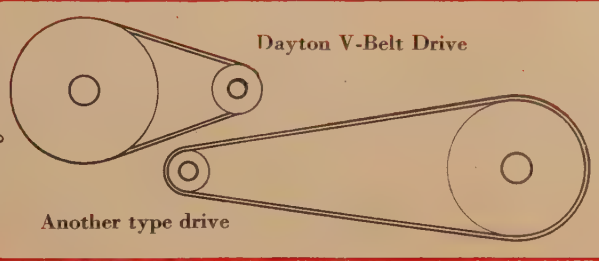
Features: Built for working pressures of 12,000 psi, it provides exceptional low torque and positive seal-off. Full 360 degree rotation with low torque takes place on two rows of hardened steel balls which serve to hold the rotating members together under pre-regulated pressure. There is a complete line of joints including more than 500 different types and sizes for pressures to 3,000 psi., and temperatures to 500 degrees F.

(Continued on page 202)

WHY DAYTON V-BELTS *Save Space*

In 1935, the superintendent of a large ice cream manufacturer found it necessary to install two additional compressor units in an already overcrowded power plant. He did it by replacing the original drives on three existing compressors with Dayton V-Belts. Because of the much shorter distances required, from the center of the motor pulleys to the center of the compressor pulleys, enough floor space was saved to enable the superintendent to install the additional two, much-needed machines! *Further savings were made by using the large flat pulley of the original drive.*

Dayton V-Belts save space because they have tremendous gripping power . . . need to contact only one-third of the pulley for efficient operation. Because of the smaller contact area required, machine and motor can be placed closer together, providing extra space for more machinery, wider aisles or for office or storage space. Space saving is one of many reasons why Dayton V-Belts can help solve your power transmission drive problems efficiently and economically. Get the full story from your Dayton Distributor. Call him today.



In most cases, the distance required between the centers of the machine and motor pulleys for a Dayton V-Belt Drive is just about half that required for other types of drives.

THE DAYTON RUBBER MANUFACTURING COMPANY

Main Office and Factory: Dayton 1, Ohio

BRANCH OFFICES: ATLANTA, BOSTON, CHICAGO, CINCINNATI, CLEVELAND, DALLAS, DETROIT, LOS ANGELES, MINNEAPOLIS, NEW YORK, PHILADELPHIA, ST. LOUIS

Rubber

EXCELLENCE IN NATURAL AND SYNTHETIC RUBBER

MANUFACTURER OF V-BELTS

One glance at Inland 4-Way Floor Plate will quickly show you how the raised projections prevent slipping and falling. These scientifically designed lugs are just the right shape for maximum safety yet prevent catching heel or toe in any size pattern.

In your plant or installed on your equipment, 4-Way Floor Plate means added safety, employee confidence and smart design. You'll find it on floors, walkways, steps, ramps, platforms, running boards, decks, hatch covers, and anyplace where dangerous slips and falls might occur.

Inland 4-Way is provided in three pattern sizes (Large, 1¼"; Medium, 1"; Small, ⅝") and thicknesses from 18 gage up to ½".

Available now from leading steel warehouse distributors. Write for catalog.

✓ Check these advantages against the flooring you are now using:

- ☐ Safe for foot or wheel
- ☐ Carries the heaviest of loads
- ☐ Lasts for years and years
- ☐ Cleans easily, drains freely
- ☐ Convenient to cut, form or weld
- ☐ Matches and installs with ease

INLAND STEEL COMPANY
38 S. Dearborn Street Chicago 3, Ill.
Sales Offices: Detroit, Indianapolis, Kansas City, Milwaukee New York, St. Louis, St. Paul

Plant Equipment Previews

(Continued from page 198)

JANUARY, 1947
PEP 56

AUTOMATIC ELECTRODES

Selection Board's Opinion: For production welding.

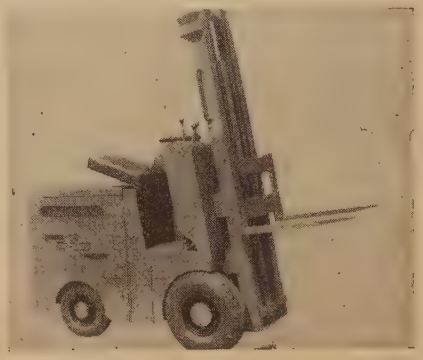
Manufacturer: Air Reduction Sales Co., Lincoln Building, 60 E. 42 St., New York 17, N. Y.

Features: This line embraces 5 knurled type wires and 5 tapes all for flat position operation and all highly recommended for low cost, uniform, automatic welding. Applications are many from thin gauge sheet metal to boilers, axle housing, and torque tubes.

JANUARY, 1947
PEP 57

FORK TRUCK

Selection Board's Opinion: Designed for fast, low cost handling.



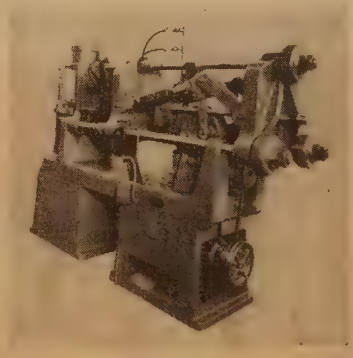
Manufacturer: Crescent Truck Co., Lebanon, Pa.

Features: Frame is a completely welded unit, designed to eliminate all unnecessary counterweighing. Forks are made of hand forged, high carbon steel and are adjustable for width and can be reversed to provide an extra ½ inch of lift. They have an initial lift of 22 inches; max. lift 140 inches. Known as model LGVH-2.

JANUARY, 1947
PEP 58

DIE CASTING MACHINE

Selection Board's Opinion: Has high speed.



Manufacturer: Light Metal Machinery, Inc., Penton Bldg., Cleveland, Ohio.

Features: Fully automatic, this high speed machine is specially suited for production

(Continued on page 204)

None Finer

BLACK

The modern packaged line of Gas Cutting and Welding Apparatus

HEAVY DUTY CUTTING OUTFIT

COMBINATION CUTTING & WELDING OUTFIT

HEAVY DUTY WELDING OUTFIT

"See Your Jobber"

BLACK

The Black Manufacturing Company

1424 WEST BALTIMORE STREET • BALTIMORE 23, MARYLAND

FORMERLY THE ALEXANDER MILBURN CO., PIONEERS IN GAS CUTTING AND WELDING APPARATUS SINCE 1907

Keep out corrosion, keep down maintenance costs . . . . .

Neolac

MIRACLE PLASTIC COATING
PROVIDES LASTING PROTECTION
FOR METAL, WOOD, CONCRETE

CORROSION goes hungry in the plant protected by NEOLAC. For this amazing new coating quickly dries to a "live" film of pure plastic so tough corrosion can't eat through. And since NEOLAC is non-oxidizing, it won't deteriorate with age . . . resists chipping and cracking, won't flake off.

SAVES MONEY—

NEOLAC lasts up to twice as long as most oil base paints, gives so much extra protection against fumes and weather . . . CUTS MAINTENANCE COSTS.

ADDS COLOR—

Wide range of NEOLAC colors includes ready-mixed aluminum, yellow, blue, gray, green, clear, red, black and white.

Write Today for Complete Information and Color Chart

RESISTS ACIDS, ALKALIES, WATER, ALCOHOL • APPLY BY BRUSH OR SPRAY • DRIES IN ONE HOUR • NO PRIME COAT NEEDED • 2 COATS AMPLE • COVERS UP TO 450 SQUARE FEET PER GALLON • NON-OXIDIZING • NON-FLAMMABLE • NON-TOXIC • RESISTS AIR TEMPERATURE UP TO 265°F.

CHAMBERLAIN ENGINEERING CORPORATION

5000 BRIMFIELD ROAD, AKRON 9, OHIO

PLEASE SEND ME FREE NEOLAC SAMPLE

Without cost send me test sample of Neolac, prices, and Neolac color chart.

Name_____

Company_____

Address_____

Plant Equipment Previews

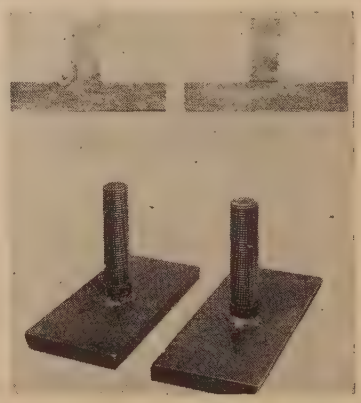
(Continued from page 202)

of zinc, lead and tin castings. Between cycle delays are eliminated by a patented cycling mechanism that provides for automatic die movement, shot and ejection in continuously repetitive cycles. Machine operates at any one of 4 fixed speeds: 240, 330, 520 and 720 shots per hour.

JANUARY, 1947
PEP 59

LOW-HYDROGEN ELECTRODE

Selection Board's Opinion: Most useful with high sulphur steels.



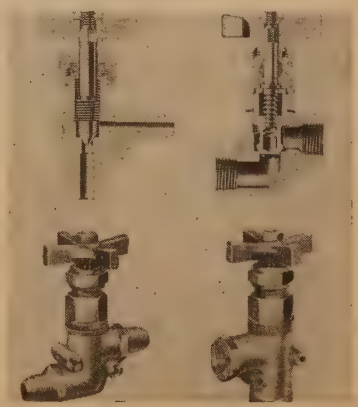
Manufacturer: The Lincoln Electric Co., 12818 Coit Rd., Cleveland, Ohio.

Features: Simplifies the welding of high sulphur, free machining steel and of certain high tensile, low alloy steels. Has a low-hydrogen, low-moisture coating and is designed with DC polarity, as the welded tensile properties are 70,000-80,000 tensile strength and the elongation is 25 to 30%. Sizes are 1/8", 5/32", and 3/16" in diameter by 14" in length.

JANUARY, 1947
PEP 60

INDUSTRIAL VALVES

Selection Board's Opinion: Small size.



Manufacturer: Parker Appliance Co., 17325 Euclid Ave., Cleveland 12, Ohio.

Features: Available in needle and globe types in sizes up to 1", and in both angle and offset designs. They are unusually small and compact by reason of forged

(Continued on page 206)

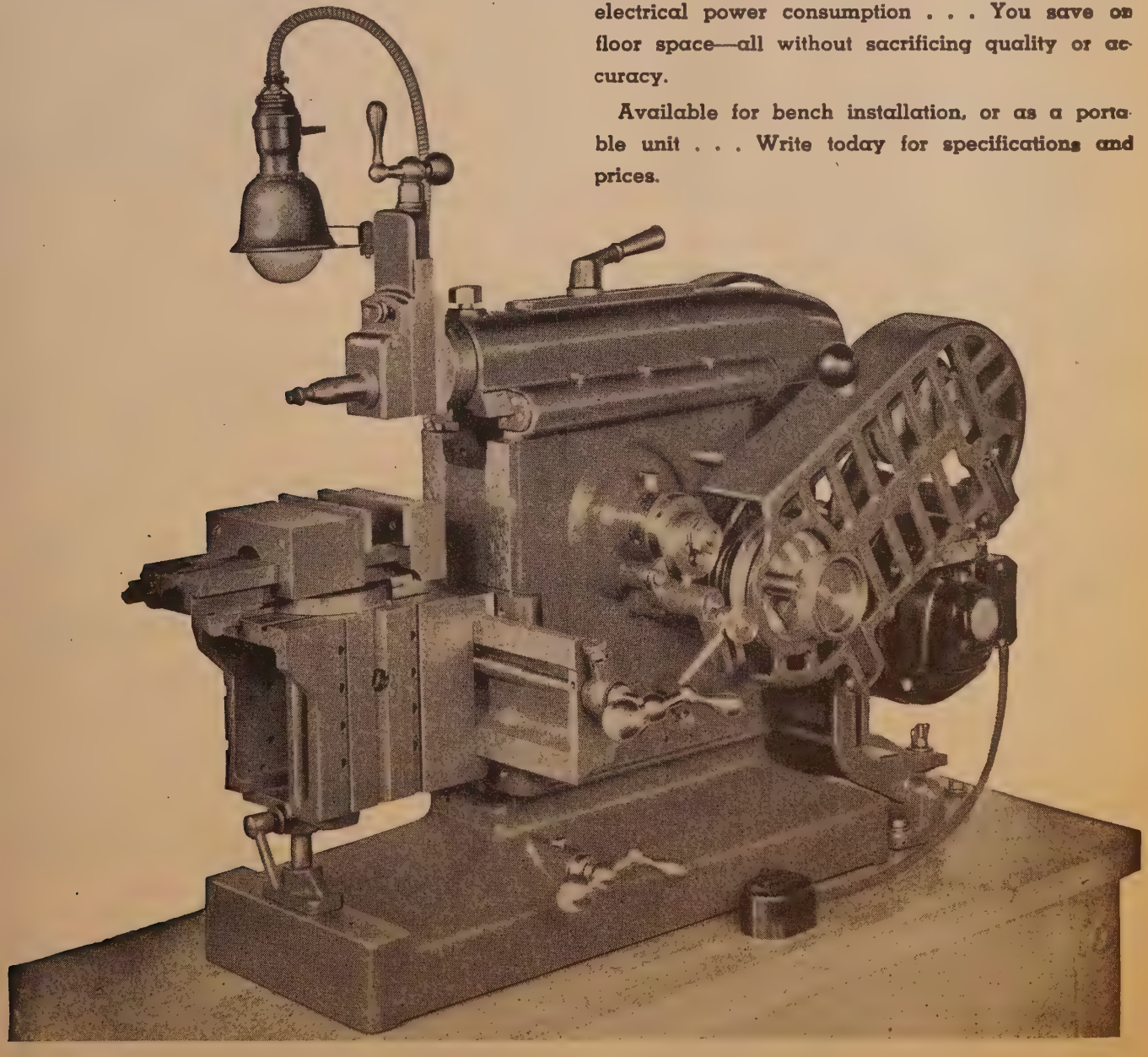
AMMCO 7" SHAPER
— A Precision Machine

Meets postwar needs for accuracy, speed and economy

If your production costs are going up, and your profit margin is getting less and less (and whose isn't)—consider what the Ammco 7" Shaper can do for you.

The accuracy of work turned out on an Ammco 7" Shaper assures precision production unsurpassed by larger machines selling for hundreds of dollars more than the Ammco . . . In addition to low initial cost, you also effect big savings in time and expense on set-up operations . . . You save on electrical power consumption . . . You save on floor space—all without sacrificing quality or accuracy.

Available for bench installation, or as a portable unit . . . Write today for specifications and prices.



AMMCO TOOLS, INC.

COMMONWEALTH AVENUE — NORTH CHICAGO ILLINOIS

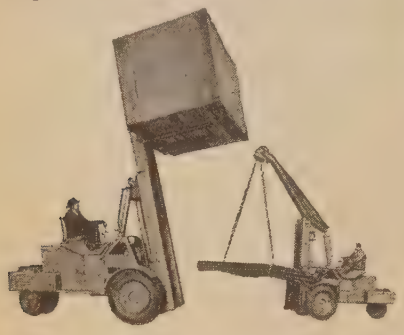
(Formerly Automotive Maintenance Machinery Co.)

POWER EQUIPMENT CUTS YOUR MATERIALS-HANDLING COSTS

KRANE KAR ⟹

Swing Boom Mobile Crane

This rubber tired boom crane lifts, totes, and spots loads up to 10 tons—of any shape or size . . . to any part of the plant or yard. Travels, and swings, tops, raises or lowers the load all at the same time or independently. One man operates it, one engine powers it. *KRANE KAR* pays its own way, doing the work of 6 to 8 men.



⟸ **LIFT-O-KRANE**

The Combination Mobile Boom Crane and Fork Lift Truck

You have at your disposal a machine that is a MOBILE BOOM CRANE when you have crane work—a FORK LIFT TRUCK when you have pallet loads. For crane work, just fold back the forks. For fork jobs, quickly and easily remove the boom. Also obtainable as a FORK TRUCK exclusively—without boom; or as a BOOM CRANE only—without forks.

Power equipment speeds handling of heavy machinery, raw materials, crates, pallet loads, steel, metal scrap (magnet and clamshell bucket available) . . . storing, stacking, tiering inside the plant or in the yard . . . loading and unloading of freight cars, trucks, trailers . . . plant alterations and repairs. Write for Catalog No. 58 on *KRANE KAR* and Bulletin No. 65 on *LIFT-O-KRANE*.

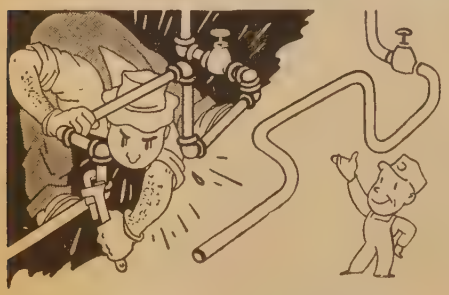
THE ORIGINAL SWING BOOM MOBILE CRANE WITH FRONT-WHEEL DRIVE AND REAR-WHEEL STEER

2½, 5, AND 10 TON CAPACITIES

KRANE KAR

TRADE MARK REGISTERED

SILENT HOIST & CRANE CO., 873 63rd ST., B'KLYN 20, N.Y.

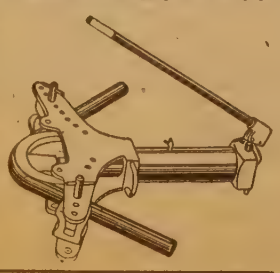


Solve the tough Ones

It's much faster, easier, cheaper, neater with

TAL'S PRESTAL PIPE BENDER

You can make those hard piping jobs easy—bend wrought iron, steel pipe and conduit from ⅜" to 3" in one single operation. Does a perfect workman-like job . . . no kinks, no wrinkles, no heating, no filling. Takes only a few minutes time. Thousands of leading industrial plants are already using this fastest working, portable pipe bender that is repeatedly specified by the U.S.Army, Navy and Maritime Commission for the critical material and time it saves. Write today for factual bulletin.



Tal's Prestal Bender, Inc.
Dept. MF-1
Milwaukee2Wis.

$58,653 Screw Costs Saved By Engineers

Due to Special Development

KEENE, N. H. (Special) -- A saving of $58,653 in screw costs alone for one customer, together with a reduction in weight amounting to 31½ tons, is the remarkable achievement credited to engineers of the New England Screw Company of this city. The saving was made through development of a special screw which replaced two screws formerly used.

"This saving is directly attributable to our Engineering Department," the president of the 50 year old firm, declared today. "Our customer asked us to develop a single part to replace two screw machine parts which were the bottleneck in otherwise high-speed production. Subsequent research revealed how we could make a saving of 43% in material on one item and 230% on the other. In actual production we used 23,370 pounds of brass wire as against 87,172 before. And the single part does the job better!"

Illustration on left shows one of the many special screws developed by this firm. Their Engineering Department will gladly co-operate with the engineers of any manufacturer using standard or special screws or headed shanks. The new catalog which fully describes the manufacture of New England Screws, will be sent to any company requesting it.

NEW ENGLAND SCREW CO.
KEENE, NEW HAMPSHIRE

Plant Equipment Previews

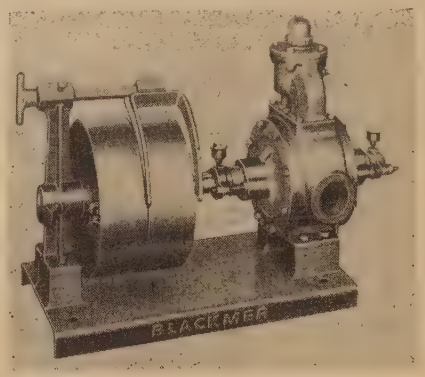
(Continued from page 204)

brass bodies. Both the needle and shut-off types are available in 6 variations of connection arrangements. Tubing has range from ¼" to 1" outside diameter, pipe from ⅛" to 1".

JANUARY, 1947
PEP 61

FLAT-BELT DRIVE PUMPS

Selection Board's Opinion: Combination bracket and shifter good.



Manufacturer: Blackmer Pump Co., 1809 Century S. W., Grand Rapids, Mich.

Features: An improvement in design is the

(Continued on page 208)

The PROOF'S in the USE

RUBYFLUID'S

BIG $1.00 SAMPLE

of liquid and paste soldering flux will convince you that you get stronger, neater, longer lasting soldering jobs with Rubyfluid Flux than you have ever had before.

Rubyfluid acts faster, saves time, speeds production. There are no harmful or objectionable fumes to affect the operator, his clothes or tools. Rubyfluid Flux makes solder flow in a thin film—makes a better appearing joint and saves solder.

Order the sample offer today—$1 for 1 pint of liquid and one-half pound of paste flux—and Ruby's new booklet of simplified instructions on "How to Solder."

THE RUBY CHEMICAL COMPANY

70 S. McDowell St.
Columbus 8, Ohio

Rubyfluid

Improved "MAXI" Surface Treated Taps

You can again get "MAXI" surface treatment on "Greenfield" Taps at no extra cost.

"MAXI" was a pre-war champion when it came to tap performance. Today's "MAXI" is *better than ever.* Intensive research in "Greenfield's" metallurgical laboratory during the war has produced better formulas for surface treatment.

WHAT IS "MAXI" FINISH?

It is a heat treatment applied to High Speed Steel tools which imparts a surface hardness greater than that of an untreated tool. This surface is applied by a chemical bath. It does not affect the basic character of the metal nor the size of the tap.

COSTS NO MORE!

You can get a "MAXI" surface treatment on any "Greenfield" HIGH SPEED tool, regular or special, in any size at no additional cost. Simply add the word "MAXI" when ordering.

GREENFIELD

GREENFIELD TAP and DIE CORPORATION
GREENFIELD • MASSACHUSETTS

MONOBELT

PATENTED

. . . the Leather Belt that takes your toughest assignment in stride

This modern leather belt offers distinctive and exclusive features that give it exceptional efficiency, anywhere in your plant. All over the country, Monobelt is doing an outstanding job, on long or short drives, in reducing power and belt costs, no matter how tough the spot in which it is placed.

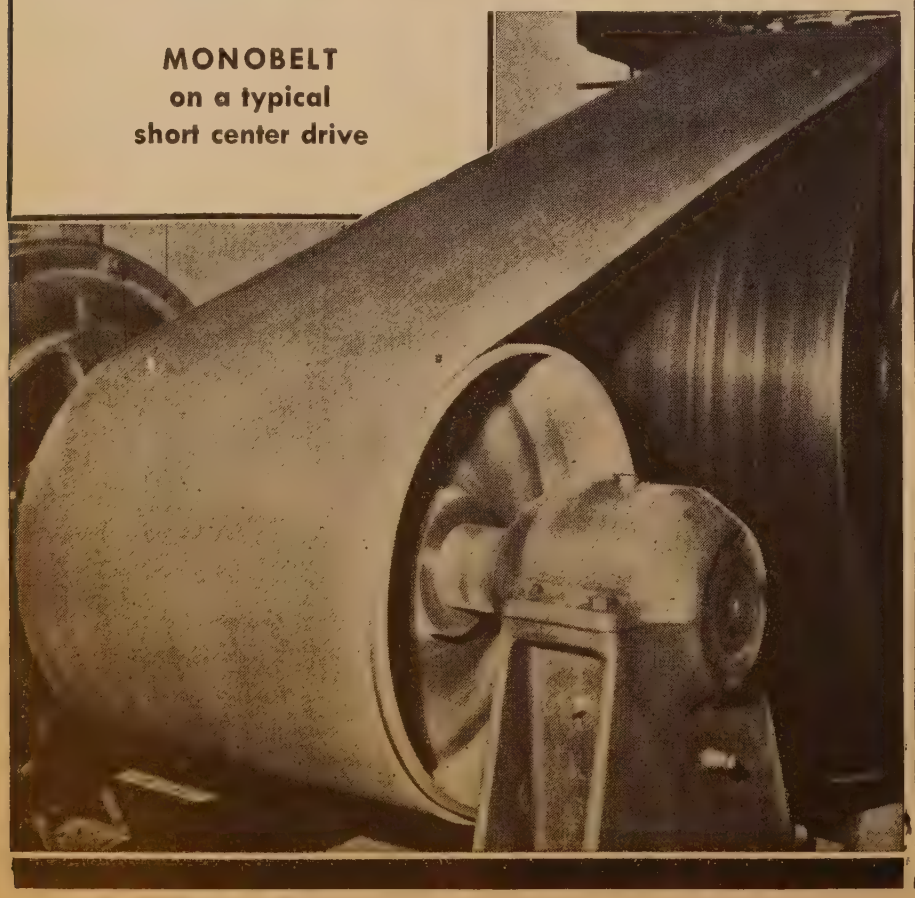
Every process in the engineered construction of Monobelt is directly under Alexander control from the raw hide to the finished product. Monobelt is made in all widths, each in the ideal thickness for best performance.

Send for the new MONOBELT Folder

ALEXANDER BROTHERS

406 N. Third Street, Philadelphia 23, Pa.

MONOBELT on a typical short center drive



Plant Equipment Previews

(Continued from page 206)

combination bracket and belt shifter of one-piece, heavier construction. The rigidity of the new bracket has been found to prolong bearing life and maintain better shaft alignment. Pump capacities range from 10 to 750 g.p.m. with pressures to 100 p.s.i.

JANUARY, 1947
PEP 62

V-BELTS

Selection Board's Opinion: High quality performance.

Manufacturer: Quaker Rubber Corporation, Comly and Milnor Streets, Philadelphia 24, Pa.

Features: These industrial belts combine: (1) Flexibility; (2) Heat resistance; (3) Abrasion resistance; (4) Balance; (5) Durability, because only new equipment goes into their manufacture.

JANUARY, 1947
PEP 63

POWER PRESS COUNTING-GUARD

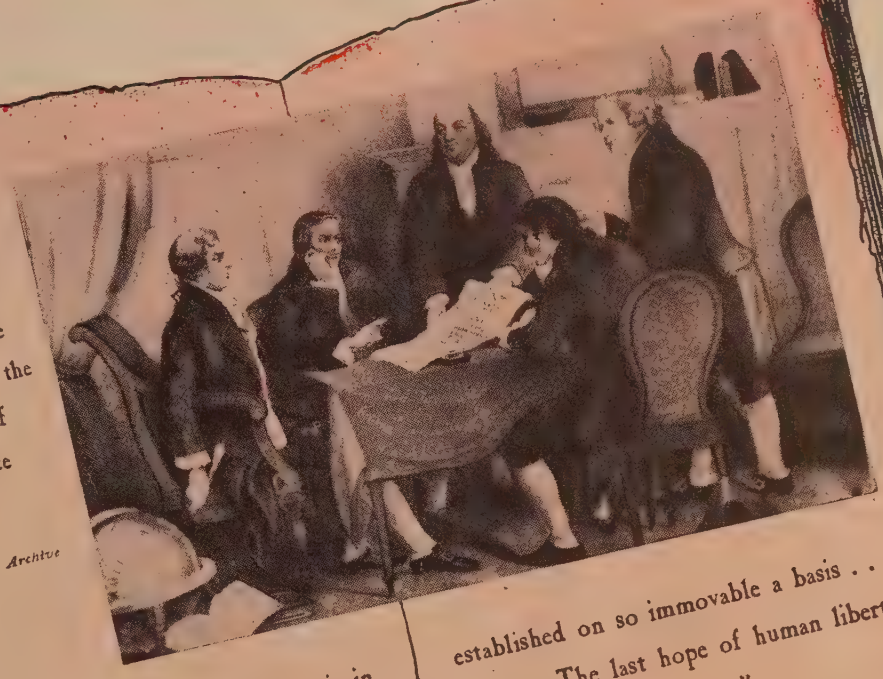
Selection Board's Opinion: Gives adequate protection.

Manufacturer: W. H. Seargent Co., 89 Allen St., Rochester 6, N. Y.

Features: The operation principle of the guard is based on the sweep action of an adjustable guard arm which works with the downward motion of the ram. Even if the link breaks, the guard still operates. An

(Continued on page 210)

FAITH



Thomas Jefferson as chairman of the committee drafting the Declaration of Independence

—The Bettmann Archive

". . . The cement of this Union is in the heart-blood of every American. I do not believe there is on earth a government established on so immovable a basis . . . ". . . The last hope of human liberty in this world rests on us."

2nd in a series on Thomas Jefferson, Third President of the United States

Thomas Jefferson's entire life was devoted to the fight for political liberty knowing in his faith that only in a FREE land can man rise to his maximum stature.

With rightful pride in this wonderful America, the "home of the brave and the free", the Jefferson Electric Company reaffirms its faith in the unlimited potentialities of the United States where there exists, as a beacon to the entire world, "liberty and justice for all."

TRANSFORMERS: Power Circuit, Mercury Lamp, Oil Burner Ignition, Control, Bell Ringing, and Luminous Tube.
FUSES: Jefferson-Union Renewable Fuses, Super-Lag, and Non-Renewable. BALLASTS for Fluorescent Lamps.

JEFFERSON ELECTRIC COMPANY

BELLWOOD, ILLINOIS *(Chicago Suburb)*

In Canada: Canadian Jefferson Electric Co., Ltd., 384 Pape Ave., Toronto, Ont.

JEFFERSON ELECTRIC

BAND SAWS
(Metal Cutting, including Skip-tooth)

THE right blade for *every* job a hack saw or band saw can do—that's what your Star supplier offers. And Star has the *line* to back him up—a *complete* line.

Whether you cut metals or non-metallics—see your Star supplier. He has the blade for longer service, fewer blade replacements—faster, cleaner cutting on any material—the *right* blade for YOU. Ask him for your free copy of "Metal Cutting"—valuable booklet of hints, helps, specifications, prices.

Sold only through recognized distributors

Plant Equipment Previews

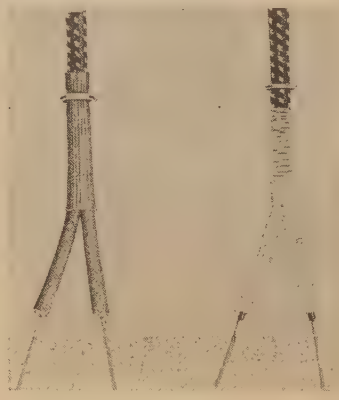
(Continued from page 208)

innovation is the automatic counter which registers each stamping but will not operate unless the guard mechanism is in place, thus giving the operator an incentive to use guard properly.

JANUARY, 1947
PEP 64

FIBERGLASS SLEEVINGS

Selection Board's Opinion: Easy to install.



Manufacturer: Bentley, Harris Mfg. Co., Conshohoken, Pa.

Features: Effects a saving of 3 minutes in the installation of a single heater cord. Method of application is to slip the sleeving over each lead, then place a larger sleeving over the cord. The sleeving may be pressed vertically upon a flat surface to spread the end so that it will fit with ease over the leads. The sleeving will not burn even in direct contact with flame.

JANUARY, 1947
PEP 65

AIR POWERED ARBOR PRESSES

Selection Board's Opinion: Quick acting and easy to use.

Manufacturer: Studebaker Machine Co., 1221 S. 9th Ave., Maywood, Ill.

Features: Two models: 1-ton and 2-ton. Both models use double acting air cylinders. The one-ton model develops 1 ton pressure on both up and down strokes at 80 lbs air line pressure, and 1½ ton ram pressure at 120 lbs air line pressure. The two-ton model develops 2 ton ram pressure at 80 lbs air line pressure and 3 tons at 120 lbs.

JANUARY, 1947
PEP 66

ALUMINUM BRAZING FLUX AND WIRE

Selection Board's Opinion: Many highly desirable features.

(Continued on page 212)

"Now the girls are threatening to strike unless we let them do their laundry on the company's time."

The Fittings that say, "ENOUGH!"

...when bearings have the correct amount of lubricant.

The *correct* amount is important. Too little grease means damaged or burned-out bearings. Too much grease leads to loss of power, internal friction and heat, excessive wear or possible bearing failure.

You *can* give your bearings the correct amount of lubricant they require at a saving of time, grease and money, and without guessing. Simply equip your ball and roller bearings with Keystone BB Fittings.

Keystone BB Fittings are easy to install and can be used with your present lubricating equipment.

KEYSTONE
TRADE MARKS REG. U.S. PAT. OFF.
SPECIALIZED LUBRICANTS

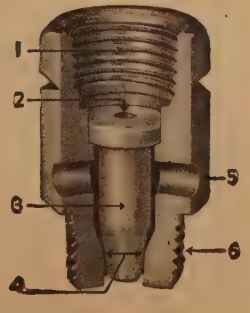
KEYSTONE BB FITTINGS

LOW PRESSURE LUBRICATION OF BALL AND ROLLER BEARINGS

TYPES FOR ALL REQUIREMENTS

HERE'S HOW IT WORKS

Attach BB Fitting to bearing at Male End (6). Screw your present pressure fitting or grease cup into thread (1). Lubricant enters fixed hollow calibration tube of grease inlet (2) and passes through tube (3) into bearings. Excess lubricant escapes through calibrated space (4) to Escape Ports (5). When bearing has received proper amount of grease, as little as 1/100 ounce will give an indication at Escape Ports.



STANDARD BB FITTING

This type fitting for attachment direct to bearing housing with pressure fitting or grease cup.

COMBINATION BB FITTING

Equipped with integral ball head for direct contact with nozzles of standard push type or hydraulic high pressure grease guns.

BB NIPPLE FITTING

For "inaccessible" bearings. Used with pipe nipples 2", 4", 6", 8", 10" and 12" in length.

•

Available in ⅛" and ¼" pipe thread sizes.

Re-issue Patent No. 20743. Other Patents Pending.

WRITE FOR BOOKLET

KEYSTONE LUBRICATING COMPANY • Est. 1884 • 21st, Clearfield and Lippincott Sts., Philadelphia 32, Pa.

Whatever your plant lubrication problems may be, call in a Keystone Distributor for complete and comprehensive recommendations.

PRECISION BRAND

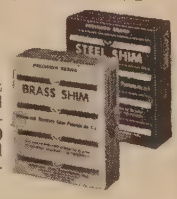
SHIM and THICKNESS GAUGE STOCK

Prepared for your Convenience

SAVES TIME • WASTE • BOTHER

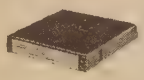
SHIM STOCK
Brass or Steel
Single rolls 6"x100" each, 600 sq. inches to the carton. All popular thicknesses. Cellophane wrapped—moisture-proof.

ASSORTED SHIM STOCK
Brass — Steel
Contains an assortment in most popular sizes of Precision Brand Shim Stock. 4 separate thicknesses 6x50" each. Total 1200 square inches. Put up in easel type display dispensers cellophane wrapped.



THICKNESS GAUGE STOCK
Precision Brand Quality—tempered, polished and edged with rounded ends—size and brand etched on each piece. This comes in 12 inch lengths in individual envelopes. 12 to the box and 9 popular thicknesses to the carton.

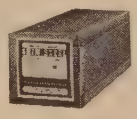
SHIM PACKETS
Brass or Steel
Flat Stock — Total 6 Pieces. Each 3⅜"x6"—120 sq. inches. 2 pieces each .001, .002, .003. 48 packets to the box.



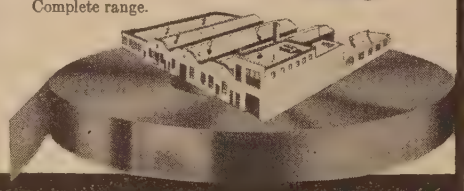
THICKNESS GAUGE STOCK
½" Wide
Precision Brand thickness or feeler gauge stock is manufactured from tempered and polished clock spring steel, specially for this purpose. It comes in dispensers—cellophane wrapper for moisture protection—and in 10 ft., 15 ft. and 25 ft. lengths. All popular thicknesses.

We now carry a complete stock of Drill Rods.

WRITE FOR FULL INFORMATION



SHIM STEEL
Heavy Sizes
6"x100" and 12"x120" in 200 pound test corrugated paper cartons. Thicknesses up to .031". Complete range.



PACKAGE GOODS DIVISION

PRECISION STEEL WAREHOUSE, INCORPORATED

4425 WEST KINZIE STREET CHICAGO 24, ILLINOIS

*Reg. U.S. Pat. Off

Benchmaster's★Improved Model

4-TON CAPACITY BENCH PUNCH PRESS

* World's largest manufacturer of small presses.

SMALL IN SIZE

MIGHTY IN PERFORMANCE

FOR STAMPING, MARKING, PUNCHING, RIVETING, FORMING AND OTHER HIGH-SPEED OPERATIONS

Light, compact and powerful, the improved, post-war Benchmaster 4-Ton Capacity Punch Press offers performance formerly found only in far larger models. Its unusual and exclusive features include a cradle base that allows the press to be inclined; a precision-ground shaft keyed by a press fit to a large eccentric to provide shock-absorbing bearing surface, bronze bushings at all wear points, a single trip action that may be made to repeat rapidly by removing a screw located in the collar, automatic knockout, an open back so that work may also be inserted from the front, a new-type floating motor mount which maintains proper tension of the V-belt, standardization of parts for quick, easy interchangeability and many other typical Benchmaster improvements.

For full information about this new Benchmaster Punch Press and other quality Benchmaster machine tools, write to Dept. MF-1.

SPECIFICATIONS:

Weight, 215 lbs.
Height, 27"
Die space, 5¾"
Center of bolster plate to frame, 3⅜"
Bolster plate, 6" x 8" x 1" with 2" hole in center
285 strokes per minute with 1725 R.P.M. electric motor
1" stroke standard
Other strokes up to 2" special

benchmaster MANUFACTURING COMPANY
2952 WEST PICO BOULEVARD
LOS ANGELES 6, CALIFORNIA

Plant Equipment Previews

(Continued from page 210)

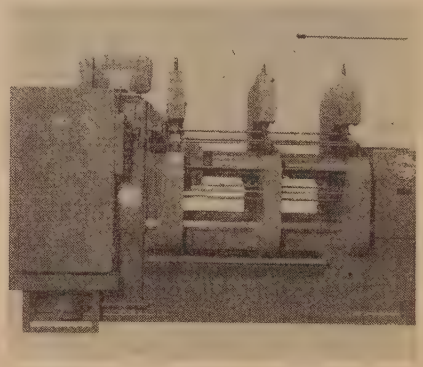
Manufacturer: Air Reduction, 60 East 42nd St., New York 17, N. Y.

Features: For brazing 2S, 3S, 53S, and 61S aluminum. Excellent results are achieved in the fabrication of a wide variety of aluminum products from cooking utensils and electrical appliances to metal furniture, window frames and other extruded aluminum shapes.

JANUARY, 1947
PEP 67

MILLING AND SPINNING MACHINE

Selection Board's Opinion: Many good design features.



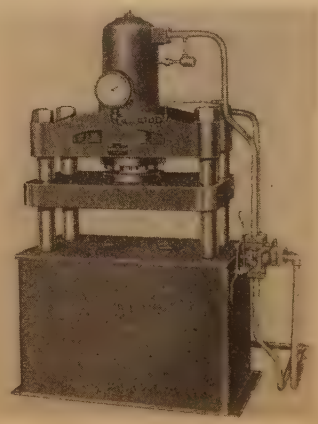
Manufacturer: Davis and Thompson Co., 6411 W. Burnham St., Milwaukee 14, Wisc.

Features: This is an index type machine with 8 stations for rough and finish milling one end of Steering Shafts and deburring and spinning a rivet head on the ends of these shafts for holding the steering worm. Machine incorporates chain clamping of the indirect type which leaves the operator free to load and unload pieces as the station passes him. Production: 300 pieces per hour. Machine weight: 14,800 lbs.

JANUARY, 1947
PEP 68

75-TON HYDRAULIC PRESS

Selection Board's Opinion: Large area platen.



Manufacturer: The Watson-Stillman Co., Roselle, N. J.

(Continued on page 214)

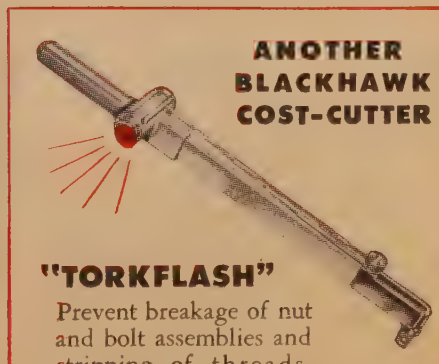
30 SECONDS the BLACKHAWK Way VS. 4 Minutes the Old Way!

210 Seconds Slashed on This Assembly Job!
The right Blackhawk Socket Wrench Combination (a brace and socket) runs down this nut in 30 seconds. Formerly, a rigid wrench took 4 minutes for the same operation.

Combinations From Blackhawk's Array of Standard Handles and Attachments Create Extra Speed . . .

WHEREVER a nut is turned on a bolt there's a Blackhawk Socket Wrench for the job. No need for special wrenches when you use Blackhawks. Choose the handle with the right leverage, add whatever attachments are necessary and you're ready to go to work. Blackhawk's patented "Lock-on" makes Blackhawk Wrenches superior for this purpose because the combination locks together into a solid tool that cannot be accidentally disengaged. And Blackhawk has a complete range of socket sizes that assure you of the right wrench for every job. See your Blackhawk Industrial Supply Distributor or write Blackhawk for catalogs.

A product of BLACKHAWK MFG. CO., Dept. W1617, Milwaukee 1, Wisconsin



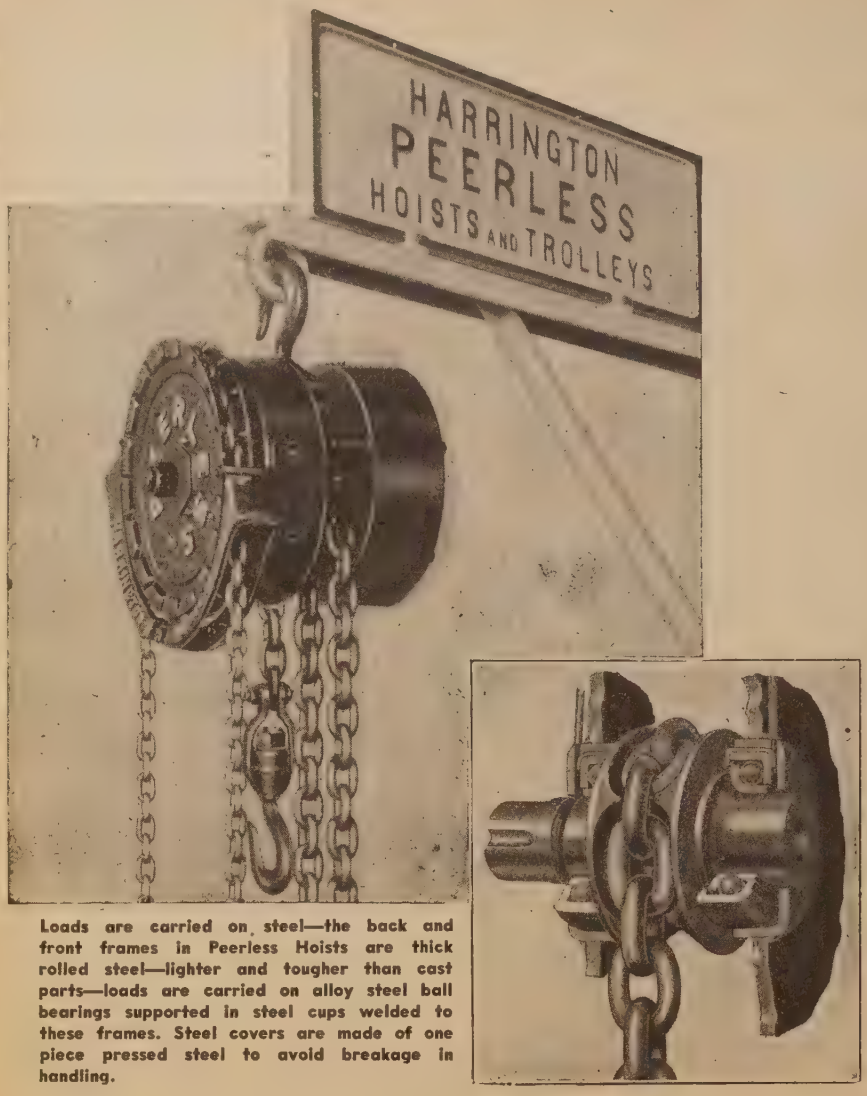
ANOTHER BLACKHAWK COST-CUTTER

"TORKFLASH"

Prevent breakage of nut and bolt assemblies and stripping of threads. Have the workman measure his pulls with the Blackhawk "Torkflash" Tension Wrench. Exclusive—a flash of light tells when to stop pulling!

Always Specify

BLACKHAWK SOCKET WRENCHES



Loads are carried on steel—the back and front frames in Peerless Hoists are thick rolled steel—lighter and tougher than cast parts—loads are carried on alloy steel ball bearings supported in steel cups welded to these frames. Steel covers are made of one piece pressed steel to avoid breakage in handling.

Invest your money and confidence in the modern hand chain hoist which has proven its worth in every branch of industry. Many styles and capacities from quarter ton to eighty tons to satisfy your requirements.

ALL STEEL PEERLESS HOISTS

A request for Catalog P will bring also immediately the dealer's name in your vicinity.

Buy from your distributor.

HARRINGTON
PHILADELPHIA 30, PA.

Plant Equipment Previews

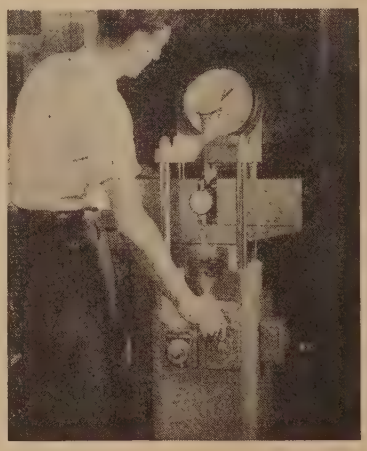
(Continued from page 212)

Features: Incorporates several advances in machinery design which makes it well fitted to handle many kinds of light embossing and laminating work. A 4-way valve, located within easy reach of operator, affords complete manual control of press at all times. Large platen area and comparatively low pressure aid the machine to achieve its purpose of light pressing. Press weight 4000 lbs; pump, 2000 lbs.

JANUARY, 1947
PEP 69

TESTING MACHINE

Selection Board's Opinion: High capacity and easy to use.



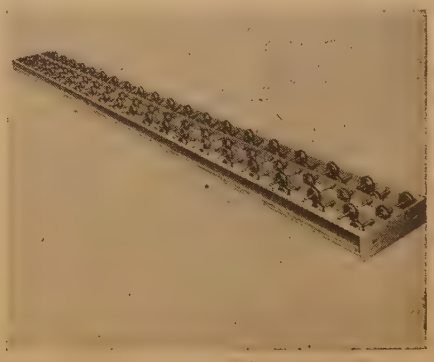
Manufacturer: Steel Testing Laboratory, 8843 Livernois, Detroit 6, Mich.

Features: A hydraulically operated, highly sensitive, transverse testing machine that tests accurately and efficiently on various specimens up to its full capacity of 10,000 lbs. Machine can be supplied with electric motor drive at voltages to suit various requirements. Gauges may be calibrated in kilogram loads if desired. Has 24" maximum span; 4" opening.

JANUARY, 1947
PEP 70

CONVEYOR

Selection Board's Opinion: Dust-proof and portable.



Manufacturer: E. W. Bushchman Co., 420 New Ave., Cincinnati 32, Ohio.

Features: Treads and hubs of the sturdy wheels used are protected with a heavy

(Continued on page 218)

LYON will make the product

Electrical Control Units

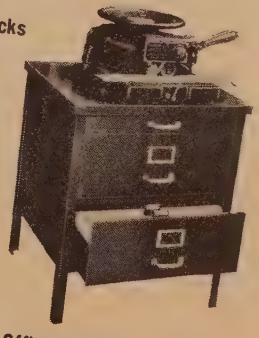
Home Appliance Stands

Water Cooler Containers

Storage Battery Racks

Special Parts

CONTRACT PRODUCTION OF SHEET STEEL ITEMS GAUGES FROM 8 TO 30



Office Equipment Stands

Testing Cabinets

1 STANDARD LYON PRODUCTS

To complete your plant expansion or conversion program, we will accept your sheet steel (12 to 24 gauge and certain sizes of band steel) and supply you pound for pound with any selection of "Lyon Standard Products" currently in production, a few of which are: Steel Shelving, Lockers, Shop Equipment, Kitchen Cabinets, Filing Cabinets, and Gravity Conveyors.

2 SPECIALIZED CONTRACT PRODUCTION

We will manufacture to your specifications: assemblies, sub-assemblies or parts, in gauges No. 8 and lighter up to No. 30; in Lyon production run quantities.

Get in touch with your Lyon Dealer . . . or your closest District Office

General Offices: 164 Monroe Avenue, Aurora, Illinois • Branches and Dealers in all Principal Cities

BIRD *Rubberlike* RUNNER

Long-Lasting Protection for

HEAVY TRAFFIC floors

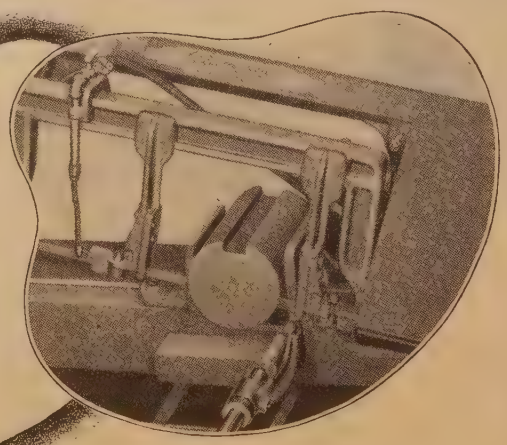
FOR LESS THAN 6¢ per Sq. Ft.

Rubberlike, the modern composition floor runner, provides positive protection for heavy traffic areas at less than 6c per square foot—a fraction of what most mattings cost. Its sturdy corrugations cushion and quiet footsteps. Skidproof even when wet, Rubberlike makes slippery floors safe to walk on. Hugs any surface without cementing—won't curl at edges. Cuts cleaning costs . . . lasts and lasts under tough treatment on floors in factories, offices, schools, hotels, institutions. In rolls 27 in. by 100 ft. or 36 in. by 75 ft. Order from supply house or write for free sample to Bird & Son, inc., 142 Washington Street, East Walpole, Mass.

BIRD Nu-Nap PRODUCTS Est. 1795 *Reg. U. S. Pat. Off.

BIRD & SON, inc., EAST WALPOLE, MASS. NEW YORK SHREVEPORT, LA. CHICAGO

CUTTING ACTION ALWAYS IN VIEW



You do not have to sit on the floor or throw your neck out of joint to check the cutting operation on the Kalamazoo Band Saw. Look right down into the cut—make adjustments while machine is operating.

Visibility is an important factor in accurate, fast, cut-off work—and the Kalamazoo provides a clear view of the job from the start to the finish of the cut.

Ask your dealer or write direct for complete information.

MACHINE TOOL DIVISION

Kalamazoo Tank & Silo Co., Kalamazoo 16, Mich.

In Canada—Bridge Machinery Co., Montreal.

Kalamazoo *Metal Cutting* Band Saw

Plant Equipment Previews

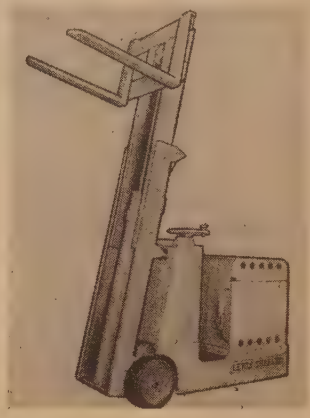
(Continued from page 214)

zinc plate. Wheel side discs are red baked enamel. A special inner seal excludes water, grit or any harmful foreign matter from the full ball bearing, ensuring long and smooth operation. Ten and 5 ft. lengths available, also 90, 60, 45, and 30 deg. curves with inside radius of 2'-6". Weight 7 to 8 lbs. per foot approx.

JANUARY, 1947
PEP 71

POWER FORK TRUCK

Selection Board's Opinion: High capacity and small turning requirement.



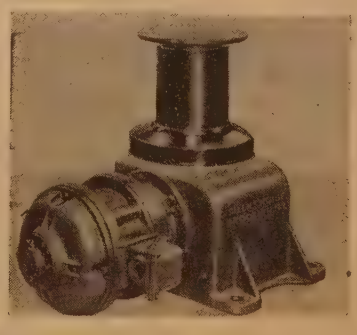
Manufacturer: Lewis-Shepard Products, Inc., 22 Walnut St., Watertown 72, Mass.

Features: Using a 48" fork and carrying a 48" load, the truck will enter an aisle 12 ft. wide and, in one continuous forward travel of the truck, make a single right angle turn and right angle stack with no backing or filling. Capacity 4000 lbs.; powered by electricity.

JANUARY, 1947
PEP 72

ELECTRIC CAPSTAN CAR PULLER

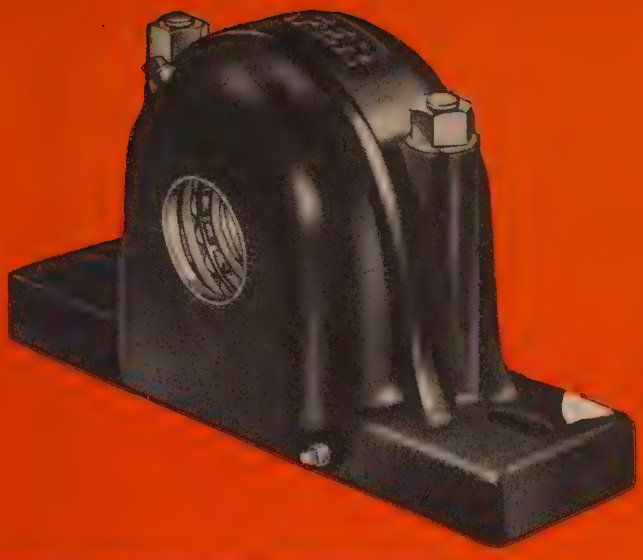
Selection Board's Opinion: Totally enclosed and runs in oil bath.



Manufacturer: Silent Hoist Winch & Crane Co., 841-877 63rd St., Brooklyn, N. Y.

Features: The gearing is integral with the motor and totally enclosed making unit dirt-proof, waterproof and ideal for all-weather out of door use. The enclosed worm-gear reduction runs in a continual bath of oil. Available in 2 sizes: a 7½ hp unit with a capacity of 5000 draw bar pull and a 15 hp unit of 10,000 capacity.

(Continued on page 222)



THE SHAFER IMPROVED SPLIT PILLOW BLOCKS

Make mounting easier and lose less production time . . . provide longer life with less attention. They are universally adaptable to line shafting and machine installation, dimensionally interchangeable with other standard makes. In straight bore or adapter types. Two or four bolt design. Equipped with the new Shafer "Z"-housing seal that keeps lubricant in and dirt out. Equipped with the famous Shafer self-contained self-aligning DE-22000 Series bearing. They have no equal.

THE SHAFER SOLID PILLOW BLOCKS

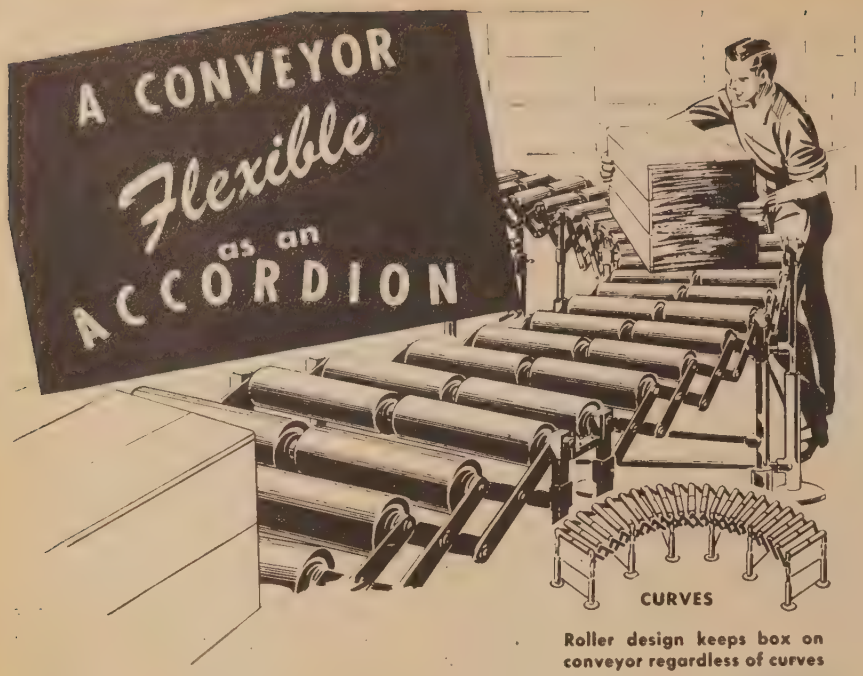
in a wide range of sizes and capacities for all classes of service and in pedestal type where additional height between base and shaft center is needed. Rugged and compact housings for the rugged and compact Shafer double row radial thrust roller bearings with integral self-alignment that simplifies designing, machining and installing. Dimensionally interchangeable with other standard makes. Two or four bolt design. Equipped with the new Shafer "Z"-housing seal that keeps lubrication in and dirt out.

SHAFER "DE-22000" SERIES SELF-CONTAINED ROLLER-BEARINGS

The Shafer self-contained unit has a one-piece outer race, spherical inner race and two roller assemblies. Preadjusted, ready to install on shaft or in housings, to locate machine parts and carry thrust loads. Readily interchangeable with other standard bearings. Generous load capacity, for radial, thrust or any combination of radial thrust loads. Integral self-alignment. Efficient distribution of load with no pinching or binding. Natural positioning rollers assure free rolling action, no end friction.

SHAFER CONCAVEX SELF-ALIGNING BEARING ASSEMBLY

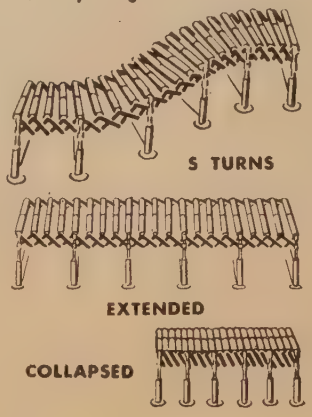
The basic Shafer bearing. The fundamental Shafer idea that merges the low rolling friction of a ball and the high load capacity of a roller into a unit that has integral self-alignment, high capacity for radial or thrust loads or any combination of the two, high resistance to shock or impact, simple in construction, easy to adjust. Available in double row as shown above, or in single row, both in a wide range of sizes and capacities.



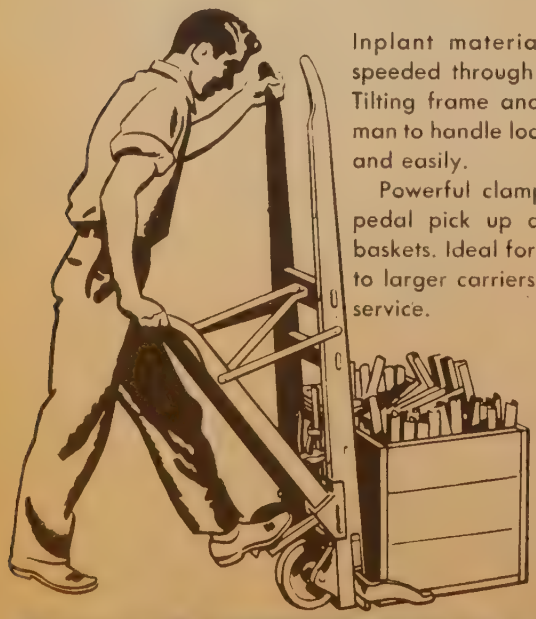
A portable gravity conveyor that sets up in all shapes and lengths. Straight lines, "S" turns, and curves are all possible with this one conveyor. No guard rails required.

Of rugged, dependable construction, but light in weight. Can be set up or disassembled by one person. Conveyor legs are independently adjustable as to height. Folds up compactly for storage.

Thousands in use. List of users includes nation's largest manufacturers as well as many small plants.



STOP INPLANT HANDLING DELAY



Inplant material handling is noticeably speeded through use of FMC Clamp Trucks. Tilting frame and unique design allows one man to handle loads up to 600 pounds quickly and easily.

Powerful clamp arms operated by a foot pedal pick up and hold loaded boxes or baskets. Ideal for crowded areas inaccessible to larger carriers. Built for long time rugged service.

A boon to the operator that pays its way in time saving.

For additional information regarding FMC Accordion Conveyors and Clamp Trucks write department MF.

FOOD MACHINERY CORPORATION
RIVERSIDE DIVISION • RIVERSIDE, CALIFORNIA

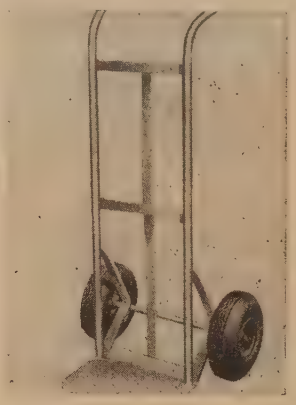
Plant Equipment Previews

(Continued from page 218)

JANUARY, 1947
PEP 73

HAND TRUCK

Selection Board's Opinion: Pneumatic tires main feature.



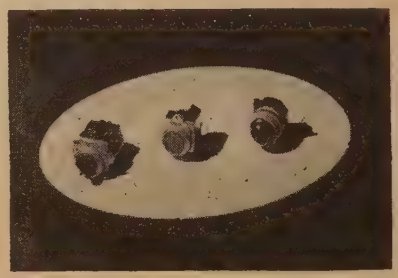
Manufacturer: The Rapids Standard Co., Inc., 108 Peoples Nat. Bank Bldg., Grand Rapids 2, Mich.

Features: A plate nose enables this truck to better handle cases, kegs and bags. Will move 500 lb load with ease. A pneumatic wheel has been adopted on this truck to bring the advantages of air wheels into warehouse and plant.

JANUARY, 1947
PEP 74

SELECTOR SWITCHES

Selection Board's Opinion: Oil proof is main feature.



Manufacturer: General Electric Co., Schenectady, N. Y.

Features: These oil tight push-button units, selector switches, and indicating lights are especially designed for the machine tool and automotive industries. Protection against entrance of oil is provided by a diaphragm seal and a rubber gasket. The selector switch is available in single-pole double-throw, or double-pole single-throw forms. Contacts are cam-operated.

JANUARY, 1947
PEP 75

2-SPEED JACKS

Selection Board's Opinion: High capacity.

Manufacturer: The Buda Company, Harvey, Ill.

Features: These 50-ton hydraulic journal

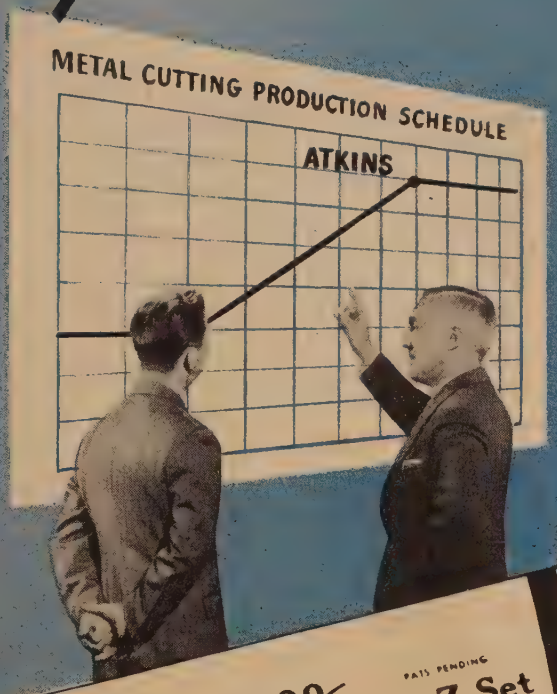
(Continued on page 224)

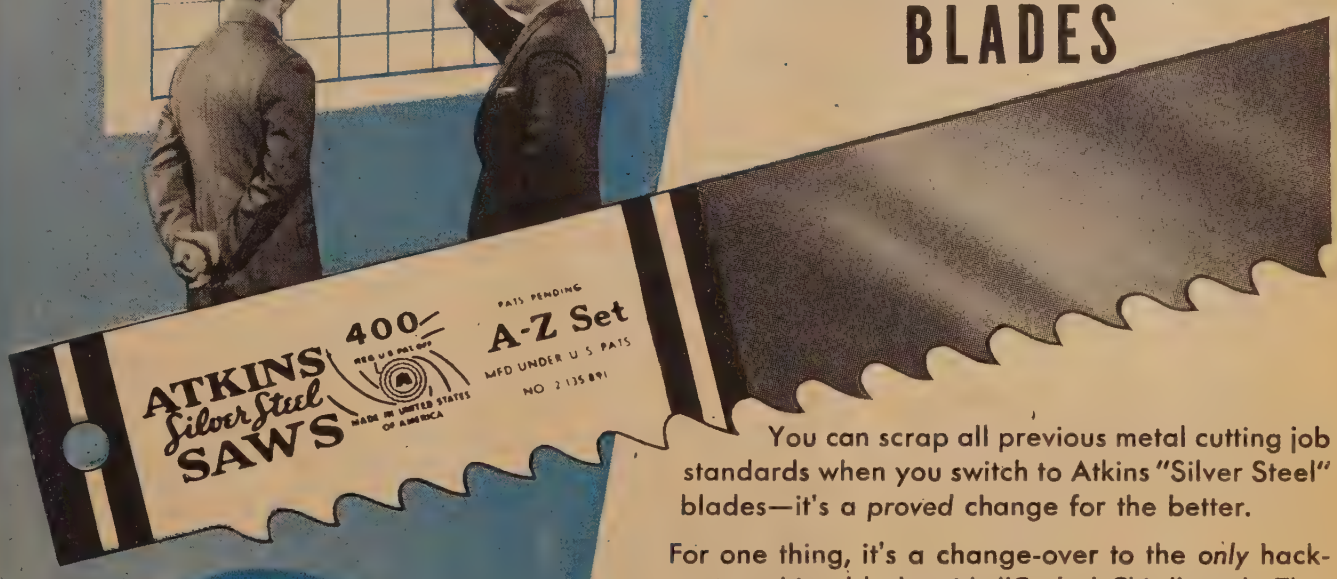
Expect the Exceptional

FROM

ATKINS

"Silver Steel" BLADES





You can scrap all previous metal cutting job standards when you switch to Atkins "Silver Steel" blades—it's a *proved* change for the better.

For one thing, it's a change-over to the *only* hack-saw machine blade with "Curled Chip" teeth. That means speedier, more accurate cutting...far longer cutting periods for every blade...higher cutting efficiency at lower costs for every metal cutting job. These are typical of many Atkins advantages—*verified* by actual case studies* in leading plants.

But most important, you can *know* in advance what savings a change to Atkins offers *you*. Just say you want an actual demonstration of Atkins cutting superiority on material you choose—an Atkins Cutting Engineer is ready to help. *Write for details today.*

*(Typical reports, of many on record, available on request.)

IMPORTANT TO USERS

Use Atkins "Silver Steel" Hacksaw Blades in connection with any tension-ing device now available —they will perform with complete satisfaction.

ATKINS "Silver Steel" FILES

Atkins Files are not ordinary files, but products worthy in every respect to carry the Atkins name. Each is made of famous "Silver Steel"... heat-treated to assure sharper cutting for a longer time... rigorously tested to certify final perfection. There's an Atkins "Silver Steel" File to meet every need.

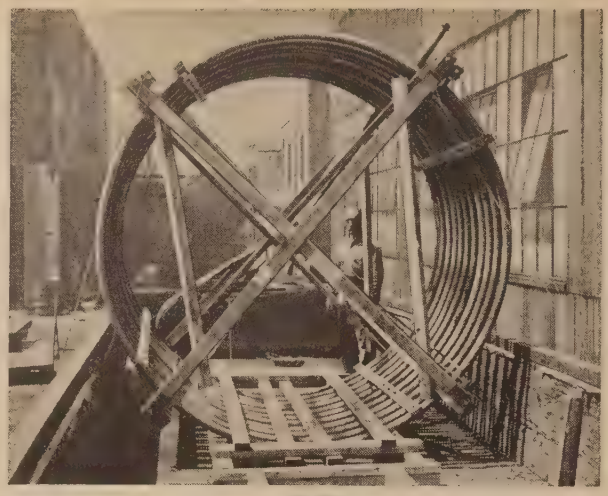
See Your Industrial Supply Distributor or Write to:

E. C. ATKINS AND COMPANY

Home Office and Factory:
455 **South Illinois Street, Indianapolis 9, Indiana**
Branch Factory: **Portland, Oregon**
Branch Offices: **ATLANTA • CHICAGO • MEMPHIS**
NEW ORLEANS • NEW YORK • SAN FRANCISCO

AAA TRADE MARK
ATKINS

ATKINS BLADES TAKE THE "HACK" OUT OF HACKSAWING



SWAN BUILT

SWAN SHIPPED

TO A CUSTOMER'S SPECIAL DESIGN
and on time

An enormous coil! Not many jobs require coils of such size. But we also shape the intricate bends in the tiny oil line of sewing machines.

The versatility of Swan service and facilities is one reason why leading manufacturers have found it to their advantage to consult our engineers on any unusual tube-bending and shaping requirement.

We welcome your special inquiries.

SWAN ENGINEERING COMPANY, Inc.
26-58 Nelson St. Bloomfield, N. J.

FOR YOUR HEAVY MOVING

GUMWOOD ROLLERS

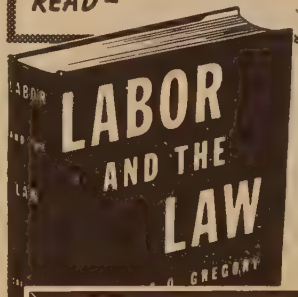
★ WILL NOT BREAK
★ WILL NOT SPLIT
★ WILL NOT SLIP

Sizes available:
4" x 6' • 5" x 6'
6" x 6' • 8" x 6'.

Special sizes made to order.

H. V. DE GALAN CO.
Detroit 7, Mich.

What's behind the strikes?
READ—



by Charles O. Gregory
Professor of Law, Chicago University

A book which clarifies U. S. labor laws and explains their application. Written by an outstanding authority, it reveals the background of the labor movement and shows how that movement fits into our legal framework. Its conclusions offer practical suggestions for the solution of ruinous strikes.

"This book is written for laymen as well as lawyers and it deserves the close attention of both. Whoever reads it will acquire a good working knowledge of the legal history of unionism. You need to know that history to understand the drift of things today."—Lloyd K. Garrison

$5.00 at all bookstores,
or postpaid from the publishers

W. W. NORTON & COMPANY
101 Fifth Ave., New York 3

Plant Equipment Previews

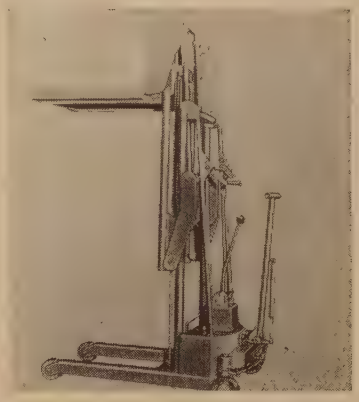
(Continued from page 222)

jacks have 2 distinct speeds, a fast speed for quickly raising light or medium loads; standard speed for raising capacity loads. One model has a closed height of 12", a rise of 7" and weighs 120 lbs. the other is 26" high with a rise of 20" and weighs 200 lbs.

JANUARY, 1947
PEP 76

TELESCOPIC FRAME FOR LIFT TRUCK

Selection Board's Opinion: Gives high elevation.



Manufacturer: Lyon-Raymond Corp., 448 Madison St., Greene, N. Y.

Features: Adaptable to higher stacking and tiering jobs, this telescopic frame increases elevated height of platform to 84" (48" is standard). In lowered position overall height of 64" is maintained, allowing truck to move through doorways and under overhead obstructions.

JANUARY, 1947
PEP 77

HOISTER

Selection Board's Opinion: Helps handling operations.

Manufacturer: Lewis Shepard Products Inc., 125 Walnut St., Watertown, Mass.

Features: A rugged production tool that fits into any manufacturing process requiring the lifting and transportation of tools

(Continued on page 226)

HOW TRANE EQUIPMENT CREATES

Weather Magic FOR AIRCRAFT ENGINE LABORATORIES

One Line of Matched Products Solved the Problem of Heating and Air Conditioning Sixty New Laboratories

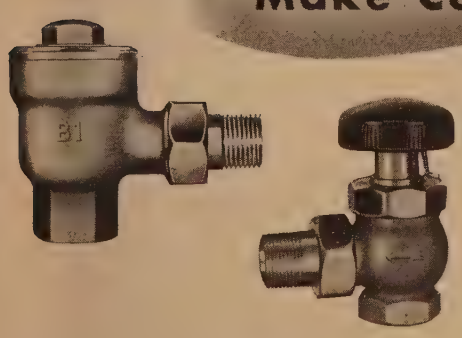
The new Aircraft Engine Research Laboratory of the National Advisory Committee of Aeronautics contributes an enormous share toward the advancement of flight. Actually the "Laboratory" comprises more than 60 experimental and testing workrooms in a number of modern functional buildings, and heating and air conditioning all of them properly presented a major problem to the builders of the project.

To the design engineers, the actual comfort heating and cooling for the project was a small matter compared with the problems of maintaining the accurate temperature and humidity conditions necessary for exacting aircraft engine tests.

To solve the many problems, the designers were called upon to create a host of individual systems—each to perform its own job. In this new project are tiny Trane Radiator Valves, Blast Heaters, Cooling Coils, Unit Heaters and Fans. All are from the single Trane line of matched products—products that are designed and built together for service together.

More than 200 Trane Field Engineers in principal cities all over the country cooperate with architects, engineers, and contractors in the application of Trane products and systems—the utilization of Trane Weather Magic.

TRANE Heating Specialties Make Complete *Systems* Possible

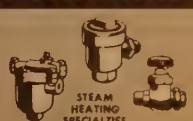


These Trane products are designed to be carried in local distributors' stocks.

Trane Steam Heating Specialties round out the wide Trane line of products, so that any Trane installation can truly be a Trane system, with every part in the system but the boiler and piping a product of Trane.

Most of the 118 types and sizes of Trane Steam Heating Specialties are now available from stock.

Illustrated are the Trane Lifetime Valve, a truly hermetic valve that is guaranteed against steam leakage at the stem, and the Trane Thermostatic Trap that features the famed Trane seamless bellows.



THE TRANE COMPANY

The House of Weather Magic

LA CROSSE • WISCONSIN

TRANE COMPANY OF CANADA, LTD., TORONTO

MANUFACTURING ENGINEERS OF HEATING AND AIR CONDITIONING EQUIPMENT

Easy lifting!

Give the average-size worker a portable, hand-operated 'Budgit' Chain Block and watch the ease and speed with which he lifts a 2-ton load!

For spot lifting jobs around your plant, you'll find a 'Budgit' Chain Block a mighty handy piece of equipment. One man can pick up the largest 'Budgit' Chain Block, carry it any place there's a load to lift by hand, hang it up, position it for lifting, then lift the load. In fact, he can lift many loads during the day — free from the danger of strained muscles, sprained back, or rupture.

The easy lifting action of 'Budgit' Chain Blocks result from all shafts — not just the load shaft alone — being supported on anti-friction bearings; from all working parts — including the automatic load brake — operating in grease in a sealed housing. Their light weight comes from design, the use of stampings, alloy steels, and heat treatments. This superior construction gives them great strength, makes them better able to withstand rough handling and abuse.

'Budgit' Chain Blocks come in sizes to lift up to ¼, ½, 1 and 2-ton loads. Prices start at $59.50 list. Send for Bulletin No. 367 for complete information.

MAXWELL MANNING M&M & MOORE INC. TRADE MARK

'BUDGIT' *Chain Blocks*

MANNING, MAXWELL & MOORE, INC.
MUSKEGON, MICHIGAN

Builders of 'Shaw-Box' Cranes, 'Budgit' and 'Load Lifter' Hoists and other lifting specialties. Makers of Ashcroft Gauges, Hancock Valves, Consolidated Safety and Relief Valves and 'American' industrial instruments.

Plant Equipment Previews

(Continued from page 224)

and raw material. Backplate bracket and platform of heavy gage steel construction; roller bearing sheave on hardened and ground shaft; ball bearing guide wheels; open end base; swivel caster.

JANUARY, 1947
PEP 78

BELT CONVEYOR FOR TRAILER TRUCKS

Selection Board's Opinion: Should reduce handling time and cost.

Manufacturer: Standard Conveyor Co., North St. Paul 9, Minn.

Features: A cantilever belt conveyor is projected into the trailer by one man to any distance up to 19 ft. The power conveyor can be operated in either direction and is always within hand reach of the man in the trailer. One man can unload 800 cases in 30". The ½ hp motor can be operated from a light socket.

JANUARY, 1947
PEP 79

MULTI-BREAKER

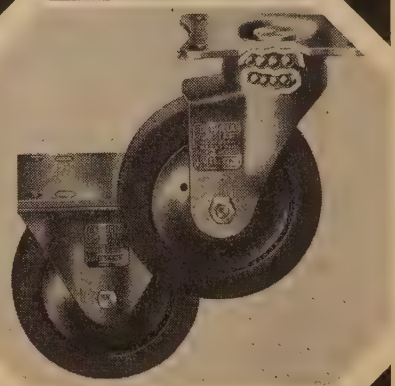
Selection Board's Opinion: Affords good protection and easy to reset.

Manufacturer: Federal Electric Co., Newark, N. J.

Features: For use in homes and housing projects as a service entrance breaker and as a distribution load center, it incorporates

(Continued on page 228)

Time Tested



DARNELL CASTERS

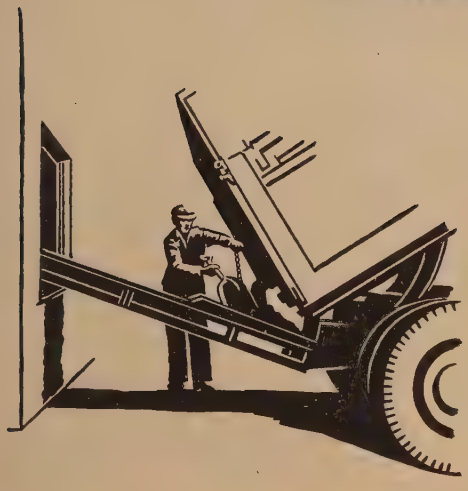
For light or heavy duty service Darnell Casters and Wheels are made for a long life of trouble-free usage, to protect floors and increase employee efficiency.

Free MANUAL

DARNELL CORP. LTD.
LONG BEACH 4, CALIFORNIA

60 WALKER ST., NEW YORK 13, N.Y.
36 N. CLINTON, CHICAGO 6, ILL.

How one N.Y.B.& P. Distributor solved a materials-handling problem



Dealers handling coal and other bulk materials are making more and more use of mechanized equipment to meet shortages of competent help, speed deliveries and reduce costs.

Recently one N.Y.B. & P. Distributor* demonstrated his resourcefulness in helping dealers solve a troublesome belt problem for their portable conveyors.

Because such conveyors operate at high speed with small pulleys on sharp inclines, a belt is required which is not only highly flexible, but prevents the material handled from slipping back.

Following this Distributor's suggestions a belt was developed having an unusually flexible duck carcass to withstand fast action over the small pulleys—also with a cross-rib cover to keep the materials from "backsliding."

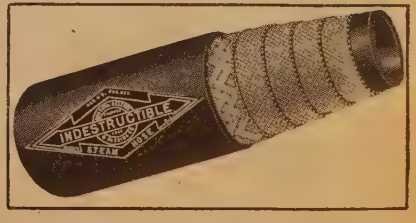
When the efficiency of this belt design was proved in service the Distributor made arrangements to have replacements available when needed.

Helping to design equipment is outside the usual service expected from a distributor of mechanical rubber goods. But N.Y.B. & P. Distributors are forever doing the unusual —displaying resourcefulness and initiative.

*W. S. NOTT Company, Minneapolis.

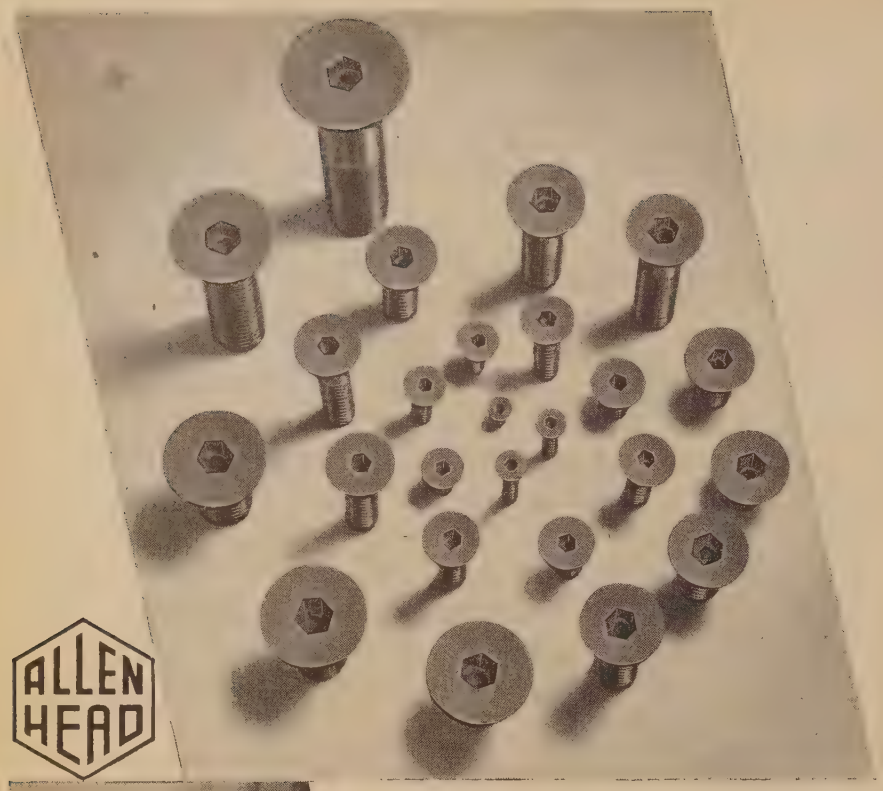
Try your N. Y. B. & P. *Distributor for such Mechanical Rubber Goods as:*

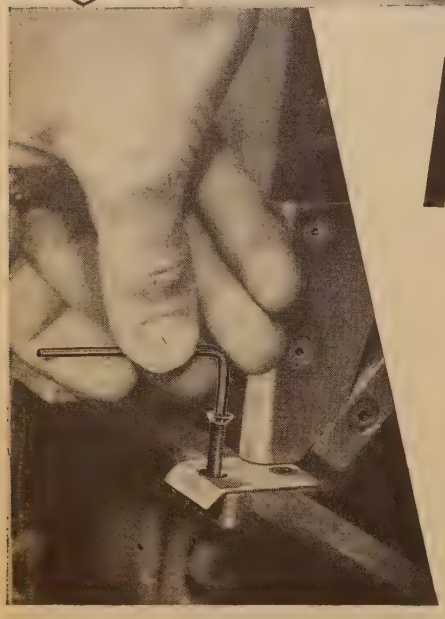
N. Y. B. & P. CONVEYOR BELT — This is the belt referred to above. Here you can see the specially developed corrugations or cross-ribs on the cover over the flexible duck carcass. These prevent coal and other materials from sliding or slipping.



INDESTRUCTIBLE STEAM HOSE — This high-safety hose is especially valuable in thawing out frozen iron ore, copper ore, and other materials. Combination wrapped and braided type, in lengths up to 50 feet.

NEW YORK BELTING & PACKING COMPANY
1 MARKET STREET, PASSAIC, NEW JERSEY





ALLEN FLAT HEAD CAP SCREWS

For perfect countersink-fit; positive wrenching

(1) Flush top surface with no gap between screw head and surrounding metal. (2) Extreme rigidity of grip, because angle of head helps lock screw in place by drawing down on a conical surface. (3) Firmer hold on thin plates of metal, by more binding surface under the head than in fillister type or cheese-head screws. (4) Shallower countersink — less weakening of metal — when used for fastening a relatively thin plate. (5) Positive engagement of hex key transmits power for tightest of set-ups without slipping, reaming or side play. (6) Maximum strength of screw itself assured by *"pressur-forming"* of special-analysis ALLENOY steel. Threaded to a high Class 3 fit. (7) Speed in assembly provided for by use of Allen hand drivers and key blades for power drivers.

Order of your local ALLEN Distributor, — or ask him for samples for try-out.

THE ALLEN MANUFACTURING COMPANY
HARTFORD 1, ★ ALLEN ★ CONNECTICUT, U. S. A.

Plant Equipment Previews

(Continued from page 226)

in a 4-pole unit both thermal and high speed magnetic tripping action. The bimetal element functions only when a sustained overload or heavy short circuit occurs and does not trip under momentary, harmless overloads. Small in size: 5-1/16" wide x 7-3/16" high and 2⅞" deep.

JANUARY, 1947

PEP 80

LIFT TRUCK

Selection Board's Opinion: Side-mounted motor is unique.

Manufacturer: Towmotor Corporation, 1240 E. 152nd St., Cleveland, Ohio.

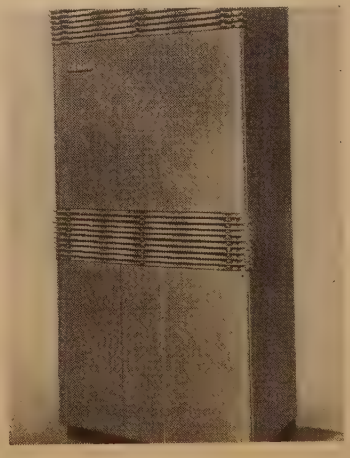
Features: Placement of motor on the side reduces overall length without sacrifice of strength. Lifting and tilting mechanisms are hydraulic. Weighs only 2800 lbs. but will carry and stack a 2000 lb. load in constricted areas, previously inaccessible to lift truck operations such as tight aisleways, trucks, etc.

JANUARY, 1947

PEP 81

AIR CONDITIONER

Selection Board's Opinion: Complete compact unit.



Manufacturer: General Engineering and Mfg. Co., St. Louis 16, Mo.

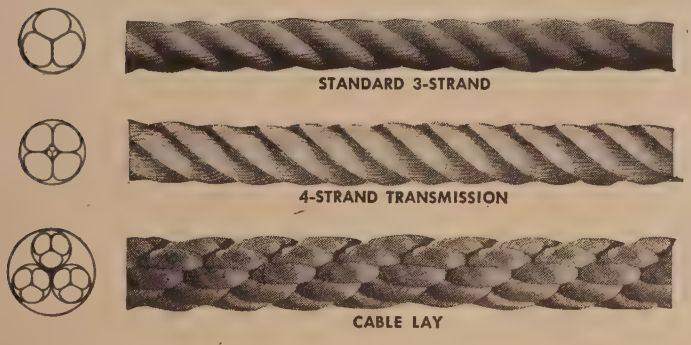
Features: Incorporates an aluminum semi-hermetically sealed motor and compressor housing. The motor is cooled by the refrigerant gas instead of with oil, as is conventional. By the use of aluminum is

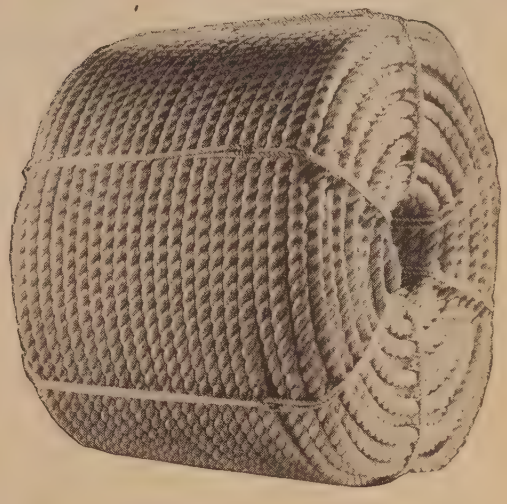
(Continued on page 230)

ROPE SPECIFICATION SHEET

"American Brand"
PURE MANILA ROPE

STANDARD AND SPECIAL LAYS IN A FULL RANGE OF SIZES





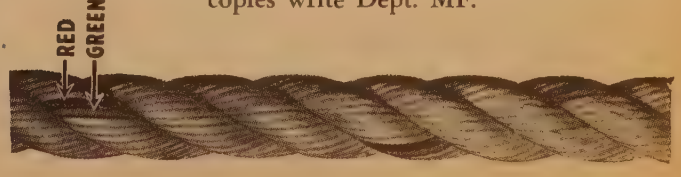
WEIGHT AND STRENGTH CHART

Diameter	Circ.	Approx. Gross Weight per Coil	Approx. Length per Coil	Approx. Feet per Pound	Approx. Weight per Foot	Min. Tensile Strength of "American Brand" Manila Rope	Safe Working Strains
ins.	ins.	lbs.	ft.		lbs.	lbs.	lbs.
3/16	3/8	45	3000	66.6	.015	450	90
1/4	3/4	55	2750	50.0	.020	600	120
5/16	1	65	2250	34.5	.029	1000	200
3/8	1 1/8	66	1620	24.4	.041	1350	270
7/16	1 1/4	63	1200	19.0	.053	1750	350
33/64	1 3/8	75	1200	16.0	.063	2250	450
1/2	1 1/2	90	1200	13.3	.075	2650	530
9/16	1 3/4	125	1200	9.61	.104	3450	690
5/8	2	160	1200	7.50	.133	4400	880
3/4	2 1/4	200	1200	6.00	.167	5400	1080
13/16	2 1/2	234	1200	5.13	.195	6500	1300
7/8	2 3/4	270	1200	4.45	.225	7700	1540
1	3	324	1200	3.71	.270	9000	1800
1 1/16	3 1/4	375	1200	3.20	.313	10500	2100
1 1/8	3 1/2	432	1200	2.78	.360	12000	2400
1 1/4	3 3/4	502	1200	2.40	.418	13500	2700
1 5/16	4	576	1200	2.09	.480	15000	3000
1 1/2	4 1/2	720	1200	1.67	.600	18500	3700
1 5/8	5	893	1200	1.34	.744	22500	4500
1 3/4	5 1/2	1073	1200	1.12	.895	26500	5300
2	6	1290	1200	.930	1.08	31000	6200
2 1/8	6 1/2	1503	1200	.800	1.25	36000	7200
2 1/4	7	1752	1200	.685	1.46	41000	8200
2 1/2	7 1/2	2004	1200	.600	1.67	46500	9300
2 5/8	8	2290	1200	.524	1.91	52000	10400
2 7/8	8 1/2	2580	1200	.465	2.15	58000	11600
3	9	2900	1200	.414	2.42	64000	12800
3 1/8	9 1/2	3225	1200	.372	2.69	71000	14200
3 1/4	10	3590	1200	.335	2.99	77000	15400
3 3/8	11	4400	1200	.273	3.67	91000	18200
4	12	5225	1200	.230	4.36	105000	21000

4 Strand wgts. about 7% more than 3 Strand

This is the very best Manila rope. It is made entirely of selected, long-fibre, Philippine hemp by one of the world's largest cordage mills. "AMERICAN BRAND" PURE MANILA ROPE reflects its quality in its appearance. It is clean, smooth and flexible, making it easy to rig and handle. It is always dependably uniform in size and strength. The special cordage solution used in waterproofing "AMERICAN BRAND" PURE MANILA ROPE imparts a stubborn resistance to moisture and drying out. It gives excellent service under the most difficult conditions. "AMERICAN BRAND" PURE MANILA ROPE is made in a complete range of sizes for utility and industrial uses.

REPRINTS AVAILABLE – This page will be valuable for specification and purchasing reference. For additional copies write Dept. MF.



LOOK FOR THE RED AND GREEN MARKERS

AMERICAN MANUFACTURING COMPANY, BROOKLYN 22, N. Y.
Branch Factories: ST. LOUIS CORDAGE MILLS, ST. LOUIS 4, MO. · DELAWARE RIVER JUTE MILLS, PHILADELPHIA 48, PA

BETWEEN MACHINES **PRODUCTION FLOW-WAY**

THE RAPIDS-STANDARD *Press-Veyor*

Keep small parts flowing steadily between machines . . . eliminate stock handling men . . . reduce worker fatigue . . . efficiently mechanize your entire production line . . . with the **Rapids-Standard Press-Veyor.**

Readily portable, the Press-Veyor is a power driven, endless belt conveyor that can be used anywhere in the plant. Where small parts and scrap are otherwise carried by hand, the **Press-Veyor** "Production Flow-Way" reduces accident hazard through better shop housecleaning . . . carries production along smoothly. Fatiguing, time-consuming, "shovel and lift" methods are eliminated.

Rugged in construction, the **Press-Veyor** is built of heavy gauge steel, to withstand the hard abuse of stamping room operations. It is adjustable at both delivery and receiving ends . . . built in 6′ and 8′ models to meet a wide range of operating conditions.

For more details on stepping up production in your small parts operations, write today for the new Press-Veyor Bulletin.

OFFICES IN PRINCIPAL CITIES

Manufacturers of
STEEL FORGED CASTERS · TRUCKS · CONVEYORS · POWER BOOSTERS

The Rapids-Standard Co., Inc.

375 Peoples National Bank Bldg. · Grand Rapids 2, Michigan

Plant Equipment Previews

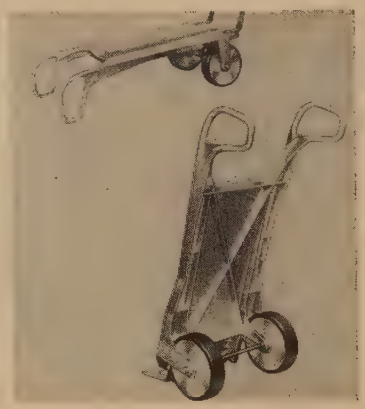
(Continued from page 228)

effected a saving of some 400 lbs in weight. The Conditioner can be connected with ordinary 1/2″ or 3/4″ water pipe and plugged into any standard electric outlet.

JANUARY, 1947
PEP 82

ALL-ALUMINUM HAND TRUCK

Selection Board's Opinion: One piece and lightweight.



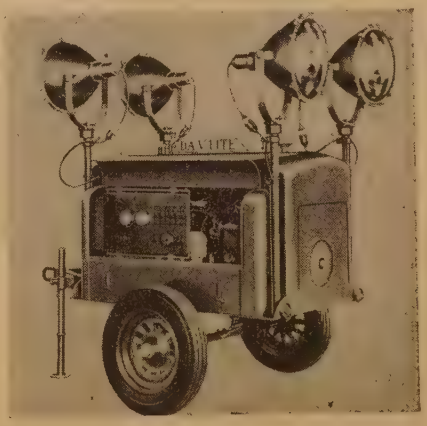
Manufacturer: Aerol Co., 1823 E. Washington Blvd., Los Angeles 21, Cal.

Features: Of one-piece permanent mold aluminum cast, the truck is furnished with 12″ x 3″ aluminum rubber-tired wheels that have sealed-in grease Timken Tapered Roller Bearings, thus giving an easy rolling load capacity of 2,400 lbs. Weighs only 100 lbs. Measures 60″ long x 23″ wide at handles, 16 1/4″ at nose with a skirt 39″ long and an 8″ toe plate.

JANUARY, 1947
PEP 83

PORTABLE LIGHTING AND POWER UNITS

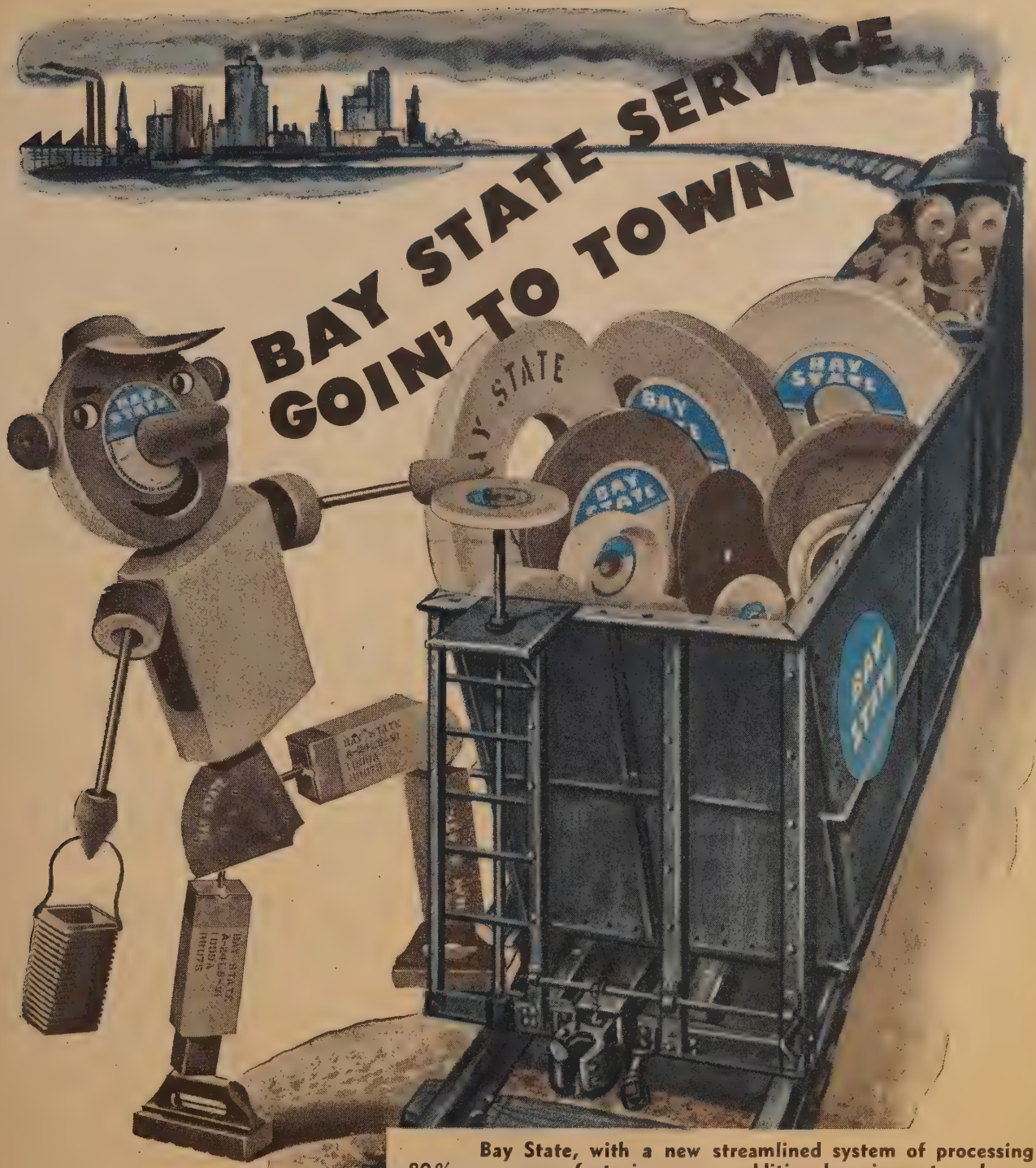
Selection Board's Opinion: Very mobile.



Manufacturer: Davey Compressor Co., Kent, Ohio.

Features: Designed to provide light and power where and when needed, the unit is built around a 5,000 watt self-excited, self-regulated AC generator, driven by a 15 h.p., 4 cylinder Wisconsin air-cooled en-

(Continued on page 232)



Bay State, with a new streamlined system of processing orders, 80% more manufacturing space, additional equipment, and new modern facilities for stock, now offers you improved delivery. We have added to our personnel, and appointed several new distributors strategically located to serve you, while our regular distributors have greatly increased their stock of wheels.

Large enough now to meet quickly all your abrasive needs, we are still small enough to give your orders individual attention.

These improved facilities and our usual high quality product warrant a trial.

Branch Offices and Warehouses — Chicago — Detroit. Distributors — All principal cities

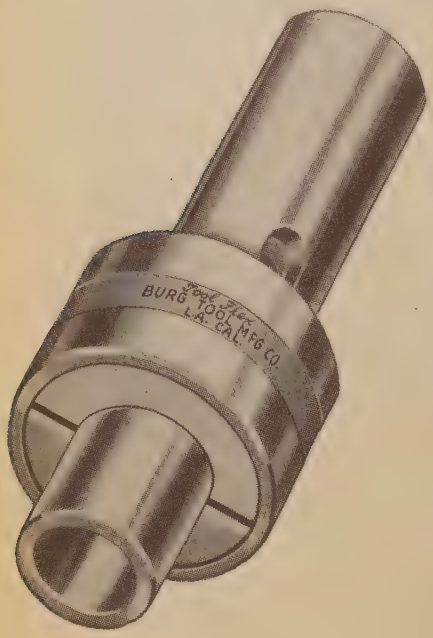
BAY STATE

Top Performance Consistently Duplicated

BAY STATE ABRASIVE PRODUCTS CO. • WESTBORO, MASSACHUSETTS, U.S.A.

oil-resistant *Neoprene* mounting

POSITIVE drive *Universal action*



ONLY 4 PARTS

Model "D" with straight shank and taper collet for reaming to close tolerances on screw machines and turret lathes. ONE OF 40 TOOL-FLEX MODELS.

TOOL-FLEX FEATURES

APPLICATIONS: For reaming, tapping, honing, and counterboring on: Multiple-Operations: tapping or drilling. Screw Machines: automatic or hand. Lathes: turret or engine. Drill Presses and radial drill presses.

4 PARTS: Oil-resistant NEOPRENE mounting; shank; collet; and adjustable retaining ring.

ADVANTAGES: Positive drive. Cuts set-up costs. Corrects misalignment. Self-centering. Reduces tool breakage. Eliminates chatter and bell-mouthing.

SPECIFICATIONS: 40 stock sizes including releasing tap-holders, quick change models, drill press models. Available for Erickson collets. Special sizes to order.

INVITATION: We invite problems in multiple tapping or drilling operations. Write our engineering department for free consultation. Address Dept. M.

Fred Burg

Sales Representatives: A few territories are open. Write for details.

Tool-flex

BURG TOOL MANUFACTURING CO.

5028 W. Jefferson Blvd., Los Angeles 16

Plant Equipment Previews

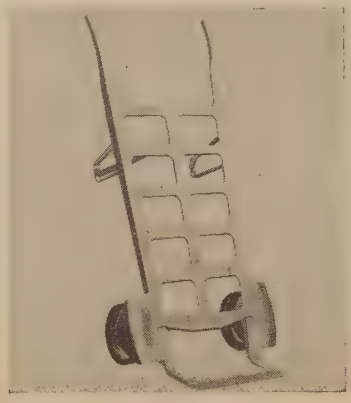
(Continued from page 230)

gine, equipped with electric starter. The 4 standard models are available in skid and 2-wheel spring trailer mountings. Trailer machines are 9' long, 7'6" high and 5' wide. Weight: 1750 lbs. approx.

JANUARY, 1947
PEP 84

HAND TRUCK

Selection Board's Opinion: Lightweight.



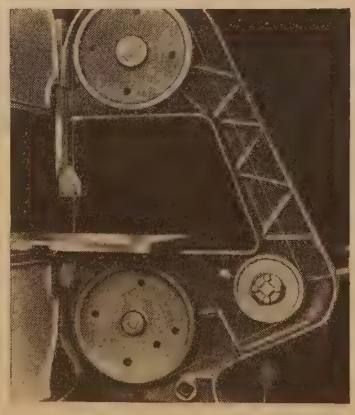
Manufacturer: Magnelux Inc., 317 E. Fourth St., Los Angeles 13, Cal.

Features: Made of cast magnesium alloy. Legs and nose are reinforced steel strongly bolted to the frame. There are 6 cross bars (with a 7th optional). These when crossed by the center vertical form only small openings and packages will not drop through, making it possible to load the truck almost to top of the handles.

JANUARY, 1947
PEP 85

BAND SAW

Selection Board's Opinion: Multiple Speed.



Manufacturer: Ermac Company, 5531 S. Vermont Ave., Los Angeles 37, Cal.

Features: The blade life is virtually doubled regardless of whether the material sawed is wood, plastic, aluminum, cold rolled steel, angle iron, tool steel or cast iron. The ability to handle any type of material lies in the 12 speeds from 85 fpm to 1750 fpm permitting adjustment to the right speed for each material, plastic, metal or wood.

(Continued on page 234)

54

Successful Ways to Speed Up and Simplify Cleaning in Factories and Mills

Send **TODAY** *for New* **FREE** *Guide to Low-Cost Maintenance Cleaning!*

...a single suggestion in this Digest may mean an important saving to YOU

Oakite invites mill, factory and shop superintendents to help themselves to the stockpile of short cuts contained in the NEW Digest of 54 money-saving maintenance cleaning, descaling and related procedures!

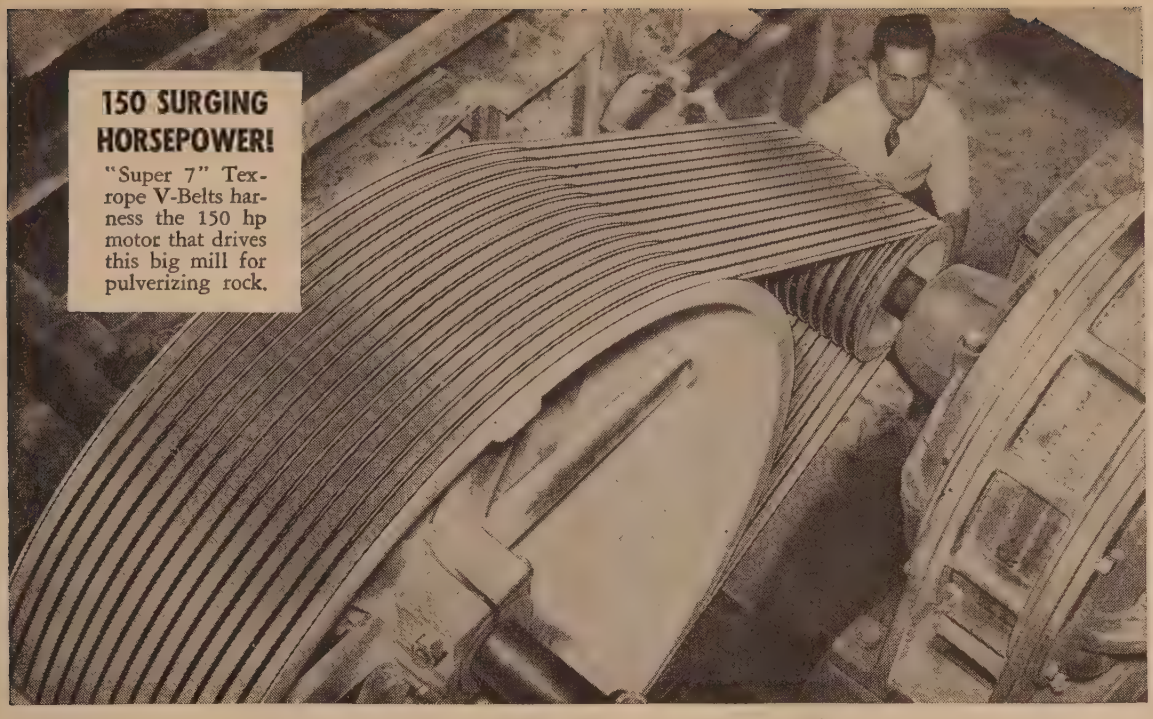
There are no generalities in this dollar-saving guide . . . only helpful step-by-step instructions on 54 equipment-cleaning and plant-maintenance jobs you can do faster and better with scientific Oakite techniques and specialized Oakite cleaning compounds. Faster stripping of varnish from armature coils; cleaning unit heaters without dismantling; efficient descaling of compressors, condensers, and coolers; time-saving, safer floor cleaning; easy maintenance of conveyor belts . . .

If only one of the 54 valuable maintenance—cleaning tips in this book saves time and money for you—it's worthwhile! That is why you will want to drop a penny postcard NOW, to bring a copy of the Digest to your desk tomorrow!

OAKITE PRODUCTS, INC.
52 Thames Street, NEW YORK 6, N. Y.
Technical Representatives in Principal Cities of U. S. & Canada

OAKITE
REG. U. S. PAT. OFF.

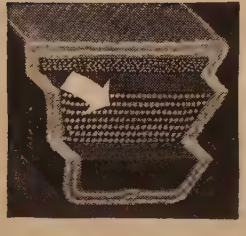
Specialized Industrial Cleaning
MATERIALS • METHODS • SERVICE



150 SURGING HORSEPOWER!
"Super 7" Texrope V-Belts harness the 150 hp motor that drives this big mill for pulverizing rock.

PULLING POWER

. . . one of the 7 Great Features in "Super 7" Texrope V-Belts!



1. STRONGER CORDS give "Super 7" Texrope V-Belts their great pulling power. These long-fibre, hard-twisted cotton cords have the strength of high-test fish lines. Laid row on row and imbedded in heat resistant rubber compound, they provide a powerful load-carrying element.

2. TOUGHER COVER. Rugged duplex construction protects the carcass of "Super 7" belts from wear and dirt.

3. HEAT RESISTANCE. *All* "Super 7" V-Belts are designed and built to give high resistance to heat.

4. SHOCK ABSORBING. "Super 7" construction combines great strength with the degree of resiliency necessary for long belt life and smooth power transmission.

5. PRECISION CURED in pressure molds to assure accurate section and perfect bonding of cords, cover and cushion.

6. ACCURATELY MATCHED. Every belt weighed, measured and carefully inspected before being sized and packed.

7. ENGINEERING LEADERSHIP. "Super 7" Texrope V-Belts represent 27 years of research and experience — by Allis-Chalmers, originator of the Multiple V-Belt Drive.

• • •

There are FIVE types of "Super 7" Texrope V-Belts, to meet every operating requirement: *Standard — Heat Resisting — Oil Resisting — Oil Proof* — and *Static Resisting*. Call your Allis-Chalmers office or dealer. ALLIS-CHALMERS, MILWAUKEE 1, WIS.

A 2161

TEXROPE .. Greatest Name in V-Belt Drives

"Super 7" V-BELTS
Five Types — Sizes to suit every power transmission job.

Texsteel, Texdrive, "Magic-Grip"
— sheaves in a full range of sizes, grooves.

"Vari-Pitch" SHEAVES
Exact variations in speed, stationery or motion control.

SPEED CHANGERS
Speed variations up to 375% at the turn of a crank.

ENGINEERING
Finest V-Belt engineering talent in the world—at your call.

TEXROPE "Super 7" V-Belts result from the cooperative research of two great companies — Allis-Chalmers and B. F. Goodrich. They are sold only by A-C.

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Production Runs Solicited

either standard or special

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QUALITY B-RIGHT-ON PRODUCTS

THE BRIGHTON SCREW & MFG. CO.

READING RD. AT FLORENCE CINCINNATI 2, OHIO

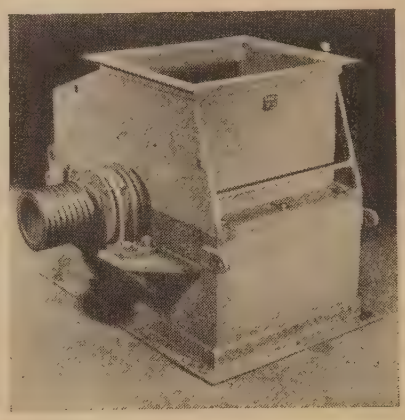
Plant Equipment Previews

(Continued from page 232)

JANUARY, 1947
PEP 86

HAMMER MILL

Selection Board's Opinion: Method of pulverizing material in mid-air a good feature.



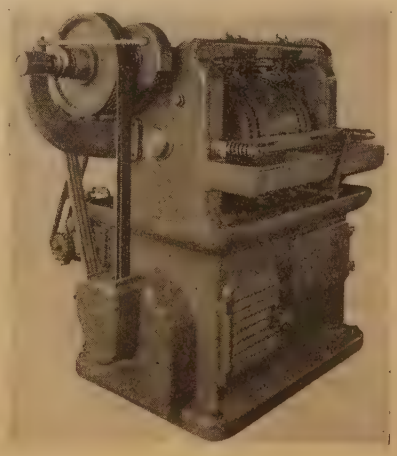
Manufacturer: Buffalo Hammer Mill Corp., 27 Washington St., Buffalo 3, N. Y.

Features: Has an overall height of 47", base 53" x 38", charge opening of 24" x 30". Useful for grinding, pulverizing, crushing, shredding, defiberizing and hashing various materials throughout practically every industry. Revolving hardened steel hammers at 1000 to 7500 rpm break up all sizes of material while suspended in mid-air. In this manner the generation of heat is eliminated from the friction of rubbing and crushing actions.

JANUARY, 1947
PEP 87

HIGH SPEED MILLER

Selection Board's Opinion: Dual type of large size.



Manufacturer: Sommer and Adams Co., Cleveland 12, Ohio.

Features: Speeds production of studs, bolts, nuts, pins, strips, etc. The high production rate is due to multiple milling cutter mountings. Other contributing factors are the quick loading chuck, automatic ejection of finished work, and easy access to cutters for adjustment or regrinding.

(Continued on page 236)

Kodak

The Kodak Transfax Process

so simple to use... in so many ways...

Transfax is a white spray, light-sensitive, quick-drying . . . It reproduces designs, legends . . . quickly and accurately . . . on metal, plastic, and many other surfaces.

It's as simple as this...

You spray it on the product-surface. Some surfaces need special primers.

You place a transparent or translucent original on the Transfax-coated surface. You expose to strong light.

You rinse with a weak ammonia solution.

You get a Transfax reproduction of the original quickly . . . inexpensively . . . without a darkroom . . . and the process can be handled by anyone with ordinary skill.

Where a long-life or a wear-resistant finish is desirable, a clear lacquer overcoat should be applied.

You can use it like this...

. . . for dials or scales

. for fabricating directions

. . . for name plates or monograms

. . . for wiring diagrams

You've seen four of the many possible uses of Transfax. To get information about applying Transfax to your particular needs, write to . . .

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SAFETY BELT HOOKS

All the best features of any Belt Lacing.

In sales and performance features, Safety Belt Lacing offers the most.

Only Safety Belt Hooks have the patented binder bars that rigidly hold hook alignment and lap over belt ends to prevent fraying—is suitable for all types of belting.

Safety Belt Lacing can be applied with any standard lacer, a lacing machine—and by using the inexpensive Safety Tu-Way Lacer, can also be applied with a hammer—is suitable for all belt lacing markets.

For the universal, all-purpose, all-market, superior belt lacing, recommend Safety Belt Hooks for volume sales and profits.

safety

BELT-LACER CO.
5386 N. MENARD AVE., CHICAGO 30, U.S.A.

Plant Equipment Previews

(Continued from page 234)

JANUARY, 1947
PEP 88

DUST COLLECTOR

Selection Board's Opinion: Eliminates ducts.

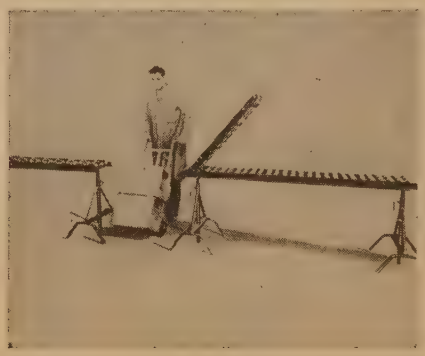
Manufacturer: Aget-Detroit Co., Ann Arbor, Mich.

Features: Has both storage and suction capacity enough for heavy woodworking operations plus an effortless and dustless means of removing large volumes of collected dust. Requiring only 8′ of floor the unit can be located immediately behind the source of the dust. The unit is rated at 1400 cfm on a single 6″ inlet and will develop a static suction up to 7.9″ of water on a single 4″ inlet.

JANUARY, 1947
PEP 89

PASSAGE WAY IN CONVEYOR LINE

Selection Board's Opinion: Useful where long conveyors are used.



Manufacturer: Rapids-Standard Co., Grand Rapids, Mich.

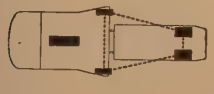
Features: The specially designed sectio finds its principle use in bridging an aisle way for passage of personnel or equip ment by providing 36″ maximum open pa sage way through a Rapid-Wheel Gravit Conveyor line. Hinged section opens b simply lifting movable part and swingin it upward until it rests on the stationa section.

(Continued on page 238)

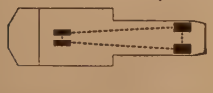
SALSBURY TURRETEER HANDLES MORE TONS PER HOUR,

SAVES YOU MONEY. Get all the details...write for Bulletin 4602-7

Specifically designed to cut cost of horizontal movement of loads up to 4000 lbs. — *more than 70% of all handlings.* Can do the work of 6 men with hand equipment. Faster, more maneuverable than hand or power walking equipment. More economical and efficient than heavy-duty equipment.



Salsbury wide, 4-point load suspension



Conventional narrow load suspension

MORE STABLE—because of the exclusive Salsbury articulation which provides 4-point load suspension based on four widely spaced rubber-tired wheels. Permits operation over sharp changes in grade levels or uneven surfaces without tying on loads. Such time-saving stability means the handling of *more tons per hour.*

FASTER—because the Salsbury Automatic Clutch and Automatic Transmission permits constant movement without delays for gear shifting. Utilizes power as needed. With 4000 lb. load and driver, Turreteer will operate 2 to 3 times as fast as comparable use equipment. Takes steep ramps in stride. It handles *more tons per hour.*

Salsbury 360° turning radius

Conventional 200° turning radius

MORE MANEUVERABLE—because power unit and drive wheel rotate with turret for steering. Full 360° turn. Reverses simply by changing direction of turret without stopping drive wheel. Turns in own length. This high maneuverability saves time in picking up, transporting and spotting loads. Result: it handles *more tons per hour.*

MORE EFFICIENT—because operator rides the load. Here is a gas-powered truck as simple to operate as any equipment made—throttle and brake are the only controls—no walking—no pushing—no fatigue. Operator can handle as many skids in the last hour as the first. Works 24 hours a day without stopping for battery charging. Cuts your costs because it handles *more tons per hour every hour of the day.*

For more complete information, send for Bulletin 4602-7

SALSBURY MOTORS, INC.

Pomona, California

A subsidiary of Northrop Aircraft, Inc.

Salsbury Turreteer—platform lift type • Salsbury Turretug—tractor type • Salsbury Turretruk—cargo type

NEW AIR-SPEED SAW and FILE
CUTS TIME CUTS COSTS CUTS PERFECTLY

Simplify difficult sawing or filing jobs with Air-Speed!

Dependable pneumatic power saw and file—Fully portable—Perfectly balanced—Weight: 3½ pounds—Operating speed and cutting stroke easily adjustable—Nothing like it for key hole, dead-end and scroll cutting in iron, steel, aluminum, copper, plastics, brass, wood, hard fibre and other materials—Gun sight nose for precision work—File can be inserted in chuck, instead of saw blade, for all filing operations—Only two moving parts guarantee long life—Fully warranted—Retails for $44.50 —Immediate deliveries.

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PLEXIGLASS LENSES

Don't miss this one! These high impact-resistant plexiglass replacement lenses are a bargain that you cannot afford to overlook. Each lens is individually injection-molded to the correct 6.00 curve for excellent optical quality. In 50 MM size, with bevel edges only. Will fit any frame that requires 50 MM lenses. Stock up TODAY, at this low price!

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Plant Equipment Previews

(Continued from page 236)

JANUARY, 1947
PEP 90

PORTABLE STAMPING CONVEYOR

Selection Board's Opinion: Portability a distinctive quality.

Manufacturer: The Rapids-Standard Co. Inc., 440 Peoples National Bank Bldg., Grand Rapids 2, Mich.

Features: This endless belt conveyor is power-driven. The "pressveyor" belt with cleats spaced on 24" centers and a belt speed of 72 fpm will move 2160 cleats over length of conveyor every hour. The 6' model is powered by 1/3 hp rt angle gear head motor operating on 115, 220, or 440 v. Is adjustable to 39° operating pitch. The 8' model is similarly powered but adjustable to 44°.

JANUARY, 1947
PEP 91

HAND TRUCKS AND WHEELS

Selection Board's Opinion: Strong, light, and easy to use.

Manufacturer: Arrow Products, 343 Indiana Ave., Grand Rapids 4, Mich.

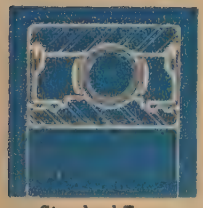
Features: The hand trucks are all-welded, tubular steel construction. Model 850 in illustration features double handles, solid steel nose plate and 8" diameter, rubber tired, ball bearing wheels. Arrow wheels are a precision product. The demountable tired wheel is suitable to all types of hand-operated trucks.

(Continued on page 240)

BEARING FACTS NO. 3

The "Cartridge" Bearing

TOMORROW'S BEARING— HERE TODAY



Standard Type

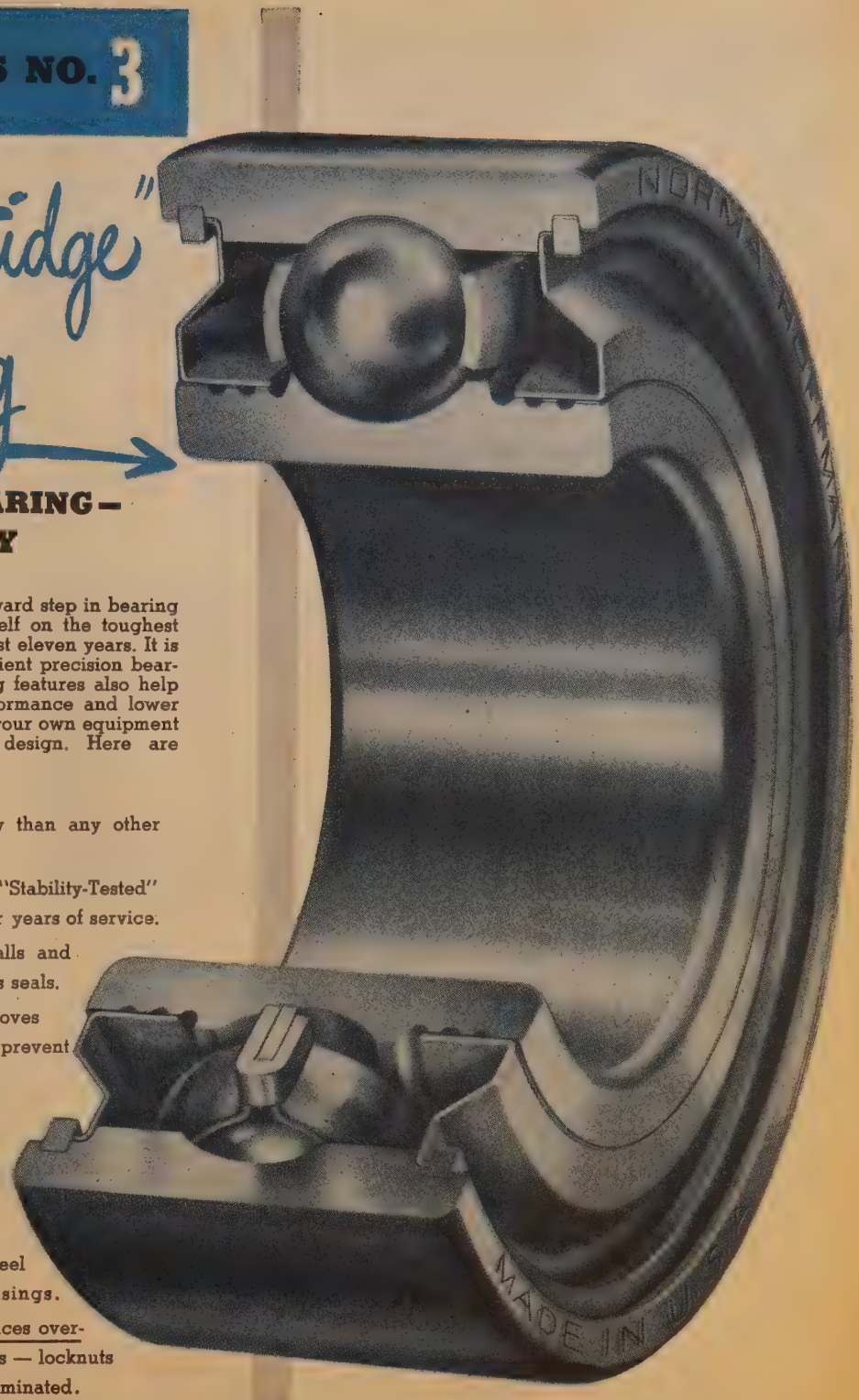
This revolutionary forward step in bearing design has proved itself on the toughest assignments for the past eleven years. It is not only a highly efficient precision bearing, but its self-sealing features also help you improve the performance and lower the cost of producing your own equipment through streamlined design. Here are the facts:

Why it is a Better Bearing

- 100% more grease capacity than any other standard self-sealed bearing.
- Factory packed with Norma "Stability-Tested" grease. Relubricate only after years of service.
- Grease retained close to balls and raceways by built-in, wearless seals.
- Flanged seals with grease grooves provide a dam against leakage; prevent entrance of dirt.

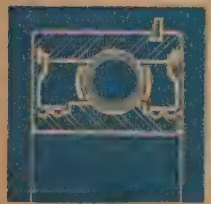
How it aids Your Design Problems

- Eliminates up to 10 machining operations and up to 22 parts required with some conventional mounting.
- Prevents slippage, peening, cocking — obviates use of steel inserts in soft metal housings.
- Increases shaft strength; reduces overhang; provides compactness — locknuts and wide sealing parts are eliminated.



PATENTED BY NORMA-HOFFMANN

HERE ARE MAJOR VARIATIONS:



Shoulder (snap) wire. No housing shoulders needed. Seals removable.

Grease filling opening. Shoulder ring optional. Seals removable.

Permanently sealed. For shafts under 20 m/m. Seals not removable.

NOTE: Write for "Cartridge" Bearing Catalogue. Address Dept. R

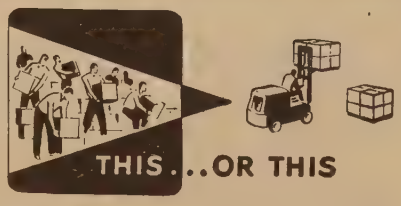
"NORMA-HOFFMANN"

PRECISION BALL, ROLLER AND THRUST BEARINGS

NORMA-HOFFMANN BEARINGS CORPORATION
STAMFORD, CONNECTICUT
FIELD OFFICES: New York, Chicago, Cleveland, Detroit, Pittsburgh, Cincinnati, Los Angeles, San Francisco, Portland, Ore., Seattle, Phoenix

Generalift
★ ★ ★ ★ ★
PALLETS

One workman and fork lift truck do the work of many. Instead of picking it up and laying it down, moving it piece by piece—many items can be consolidated into single loads, palletized, moved as one.



That's why so many thousands interested in the speedier and more efficient handling of materials, components, and finished products are turning to pallets. That's why you, too, should check on this important subject *today.*

Generalift Pallets, Skids, and Lift Boxes are made of sturdy hardwood construction. Designed for long life, rough handling, extra heavy loads—made to your specific requirements. For complete information, write for free Pallet Booklet.

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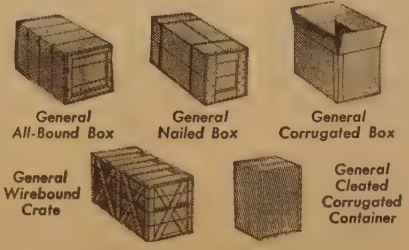
GENERAL OFFICES: 506 N. Dearborn St., Chicago 10, Ill.

DISTRICT OFFICES AND PLANTS: Brooklyn, Cincinnati, Detroit, East St. Louis, Kansas City, Louisville, Milwaukee, New Orleans, Sheboygan, Winchendon.

Continental Box Company, Inc.: Houston, Dallas.



ECONOMIZE . . . PALLETIZE . . . GENERALIZE!

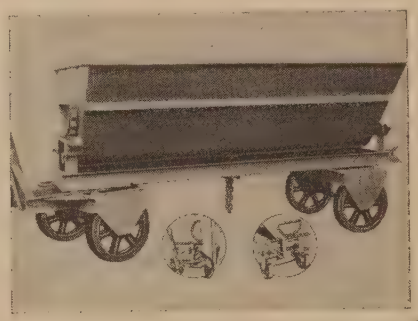
Plant Equipment Previews

(Continued from page 238)

JANUARY, 1947
PEP 92

MATERIALS HANDLING EQUIPMENT

Selection Board's Opinion: Heavy duty machine with great flexibility.



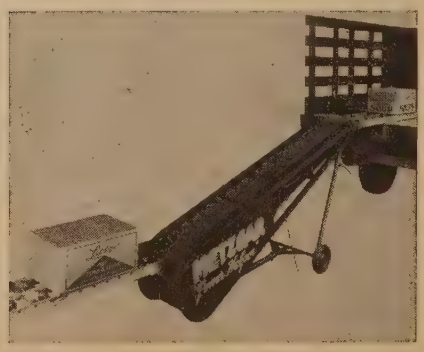
Manufacturer: Palmer-Shile Co., 7112 W. Jefferson, Detroit 17, Mich.

Features: A side dump trailer in which dumping is controlled to right or left side as desired. Automatic coupler at rear permits use of trailer in train hauling. Body of trailer is of heavy gage reinforced steel. Pull bar is 30" long. Has 4 metal wheels 18" x 3½" roller bearing, with moulded-on rubber tires.

JANUARY, 1947
PEP 93

CONVEYOR

Selection Board's Opinion: Adjustability gives it many possibilities.



Manufacturer: Metzgar Co., 427 Douglas St., N. W., Grand Rapids, Mich.

Features: The latest innovation in both the power horizontal and booster conveyor, combining the feature of using the side trough for a parts conveyor. An automatic belt tensioning gives 2 to 3 times longer belt life. The machine is adjustable from a horizontal 18" high machine to a 45° pitch.

JANUARY, 1947
PEP 94

INDUSTRIAL BOX TRUCK

Selection Board's Opinion: Easy to use.

Manufacturer: Rolock Inc., Fairfield, Conn.

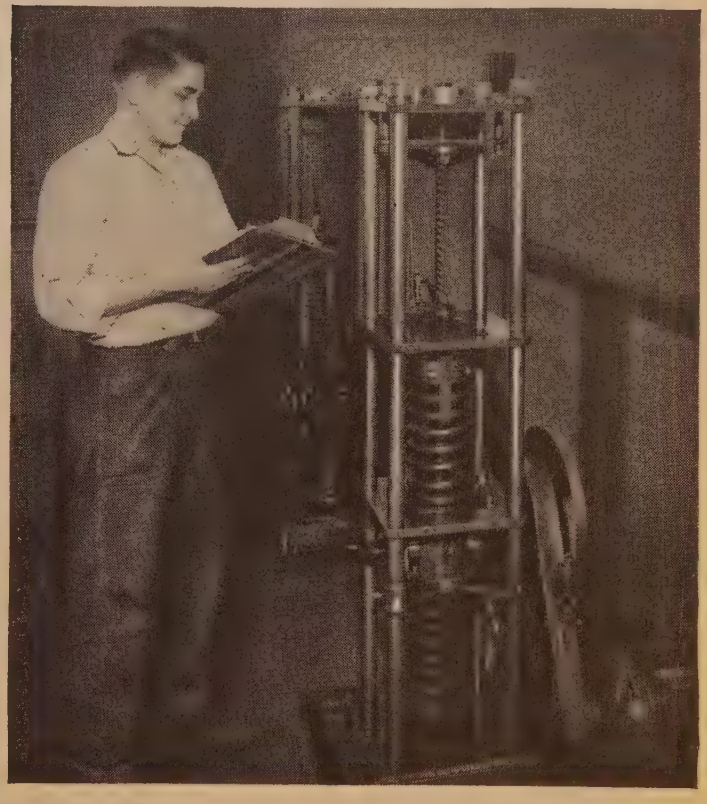
Features: Designed to save energy and time in moving boxes containing compact, heavy

(Continued on page 242)

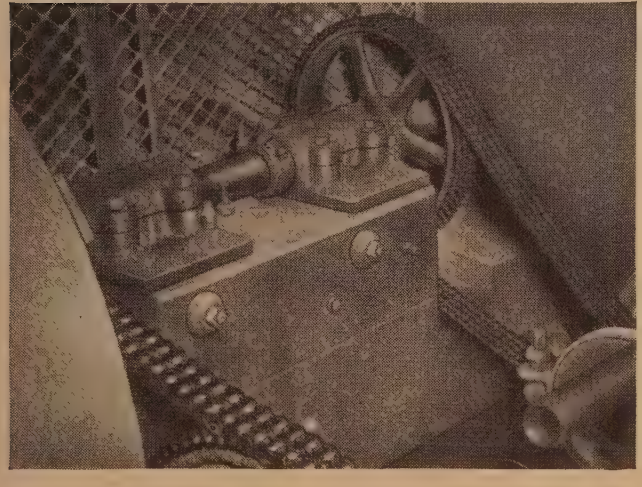
do you know Roller Chain...

is actually elastic!

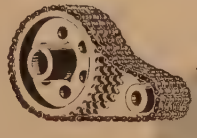
1 AND HERE'S WHAT that means to you. Where your equipment is subjected to momentary overloads and sudden strains, the inherent elasticity of roller chain will help absorb those damaging shocks and protect your equipment.



2 WE'VE ACTUALLY PROVED that roller chain is elastic. With this testing machine, designed and built by our engineers, we stretch this small section of Baldwin-Rex Roller Chain about ⅛-inch with each load application. We do this more than 10,000,000 times. Each time the chain must withstand the load and retract to its original length in order to meet our rigid specifications.



3 TAKE THIS CALENDER DRIVE. The elasticity of that Baldwin-Rex Chain enabled it to withstand the severe shock loads as lumps of crude rubber are squeezed through the rolls. It's been in service more than 30,000 work hours and is still going strong. Previous drives gave only 6 months' service. That's real proof!



You can simplify replacement, cut costs and help speed deliveries by specifying standard roller chain. Your Baldwin-Rex man will be glad to give you all the facts and help you with your application problems. Call him or write us direct.

BALDWIN·REX

ROLLER CHAINS

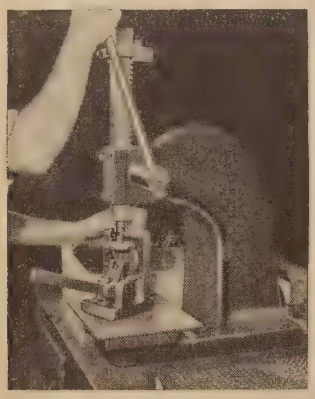
BALDWIN-DUCKWORTH DIVISION OF CHAIN BELT COMPANY

383 Plainfield Street, Springfield 2, Massachusetts

"1.4¢ A YEAR FOR MAINTENANCE"

famco

ARBOR PRESS



A POWERFUL MACHINE THAT NEEDS NO POWER

A midwestern manufacturer of automobile accessories and household appliances (name on request) has purchased 1,659 Famco Arbor Presses in the last 10 years for production line assembly operations. Over that period the cost to maintain these constantly busy machines averaged 14 cents per press. Famco Presses, in sizes up to 15 tons pressure, require a small investment . . . speed up ordinarily slow work . . . cost nothing for power . . . require little floor space . . . are easily portable. Write today for complete information, without obligation.

FAMCO MACHINE COMPANY
1342 18TH STREET • RACINE, WIS.

famco machines

COST CUTTING

• SQUARING SHEARS
ARBOR PRESSES • FOOT PRESSES

Plant Equipment Previews

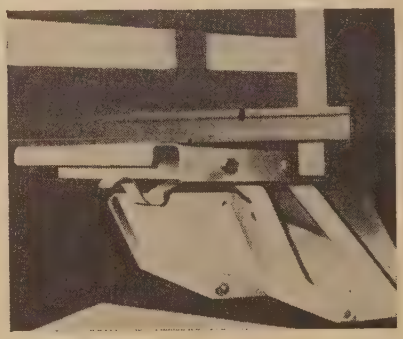
(Continued from page 240)

loads of metal parts. Consists of strong metal frame holding two sets of ball-bearing rollers, one on which the load rests and another that rolls it to destination. A traction-hook fits through any one of a series holes in the shoulder high handle to fit any height of any box to be rolled onto the frame.

JANUARY, 1947
PEP 95

FOLDING STEPS FOR TRUCKS

Selection Board's Opinion: Retractable feature is outstanding.



Manufacturer: Safety Step Co., 1017 S. LaBrea Ave., Los Angeles 35, Calif.

Features: These steps are engineered for use on flat racks, stake bodies, vans, trailers,

(Continued on page 244)

Magnesium Castings Are Available Now

Often At Equal Or Less Cost

Because of their excellent machining qualities, magnesium castings often cost less than finished castings of other metals. We make Magnesium alloy castings of all sizes, from a fraction of an inch up to six feet in diameter for a variety of uses, including aircraft, textile machines, office equipment, scales, fish line manufacturing, vacuum cleaners and toys. Why not investigate the possibilities of using Magnesium?

Write for complete information to

UTICA RADIATOR CORPORATION
Magnesium and Aluminum Castings
UTICA 2, N.Y.

Strataflo

FOOT AND CHECK VALVES

End leakage troubles . . . save their cost many times over in service calls they eliminate. Ideal for jet type pumps. Made in six sizes. Ask for Bulletin 201.

Order from your Jobber

WHITE MACHINE WORKS
FORT WAYNE 1, INDIANA

ALLEN SODERING PASTE

SAVES TIME — SAVES LABOR because it produces sodered work that stands the gaff—is fumeless and non-poisonous.

ALLEN
REG. U.S. PAT. OFF.

ALLEN SODERING LIQUID

L. B. ALLEN CO. INC.
6733 Bryn Mawr Avenue
Chicago 31, Illinois

CONFIDENCE . . . how much is it worth?

IN 1841, two years before the first telegraph line was installed in this country, and when there were but 27 states in the Union, John August Roebling was inspired with the idea of making a new kind of rope of unheard of strength and flexibility. His confidence in his idea caused him to risk everything he had on the development of his new rope.

How much is his confidence worth to Industry today, which couldn't turn a wheel without the modern wire rope?

Today, the John A. Roebling's Sons Company invests much time, effort and money in the development of improved products to keep alive the confidence of its many customers.

Roebling values this confidence as its greatest asset. That's why it offers you the greatest value for every dollar you invest . . . in *any* Roebling product.

HOW TO SAVE WIRE ROPE DOLLARS

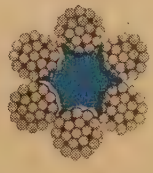
Wire rope is a machine of many parts and, like any machine, even the finest of wire ropes can be destroyed quickly through faulty installation or improper maintenance. To insure against this possibility, Roebling established its Field Engineering Service.

Every Roebling Field Engineer has a thorough knowledge of wire rope . . . its types, its uses, its features and limitations. This knowledge plus the experience he gains in his daily contacts can be a great asset to you . . . helping you to solve those tough wire rope problems . . . giving you more service for each wire rope dollar.

Get to know your Roebling Field Engineer. Call him at your nearby Roebling Branch Office.

JOHN A. ROEBLING'S SONS COMPANY
TRENTON 2, NEW JERSEY
Branches and Warehouses in Principal Cities

FOR EXAMPLE—"BLUE CENTER" STEEL WIRE ROPE



Roebling entrusts your confidence in Roebling and Roebling products to the performance of its "Blue Center" Steel Wire Rope. It is the best rope Roebling knows how to make. It is available as preformed or non-preformed, in a complete range of sizes and constructions to meet a great variety of operating conditions. Its uses are almost unlimited and its performance is consistently economical.

Manufacturers of Wire Rope and Strand • Fittings • Slings • Screen, Hardware and Industrial Wire Cloth • Aerial Wire Rope Systems • Hard, Annealed or Tempered High and Low Carbon Fine and Specialty Wire, Flat Wire, Cold Rolled Strip and Cold Rolled Spring Steel • Ski Lifts • Electrical Wire and Cable • Suspension Bridges and Cables • Aircord, Aircord Terminals and Air Controls • Lawn Mowers

ROEBLING

A CENTURY OF CONFIDENCE

JR ROEBLING

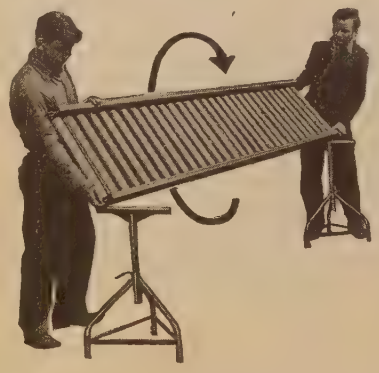
IT'S NEW!

FERGUSON

"TURN-IT-OVER"

CONVEYOR

NOW . . . a dual purpose conveyor in ONE unit!



Yes . . . simply turn it over and you transform the unit from one type conveyor to another.

Write . . . right now . . . for descriptive folder and prices on this NEW dual-purpose FERGUSON "TURN-IT-OVER" roller gravity conveyor.

WHEEL CONVEYORS
ROLLER GRAVITY CONVEYORS
BELT CONVEYORS
PORTABLE BELT CONVEYORS
DOLLIES

Harry J. Ferguson

Complete Labor Saving Material

HANDLING EQUIPMENT

115 West Avenue

JENKINTOWN, PA.

Plant Equipment Previews

(Continued from page 242)

etc. In closed position, the steps are compactly folded under bed of vehicle. When the simple trip is manually operated, 2 sturdy 16" slip proof steps instantly swing down and lock into position ready for use. Will effect savings in money, time, accidents, driver fatigue, and reduction in hernia cases.

JANUARY, 1947
PEP 96

SHOVEL AND CRANE

Selection Board's Opinion: Adaptable to many styles.

Manufacturer: The Thew Shovel Co., Lorain, Ohio.

Features: Embodying many new engineering and design principles, including unit assembly, this combination shovel and crane can be equipped with a choice of 5 interchangeable booms and 10 types of mountings, enabling it to meet all job conditions.

JANUARY, 1947
PEP 97

SYNCHRONOUS MOTOR

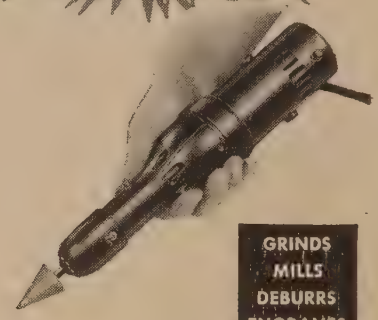
Selection Board's Opinion: Small and compact.

Manufacturer: The R. W. Cramer Co., Centerbrook, Conn.

Features: Developed to fill the need for a more powerful, small, precision built, self starting motor of high operating efficiency. It is of compact construction and has an extremely high torque of 30" oz. at 1 rpm. Power input is low, using only 2.7 watts at 115 or 230 volts, 60 cycles. Average heat rise is 30 degrees C. It has a low rotor speed of 240 rpm at 60 cycles.

(Continued on page 246).

New



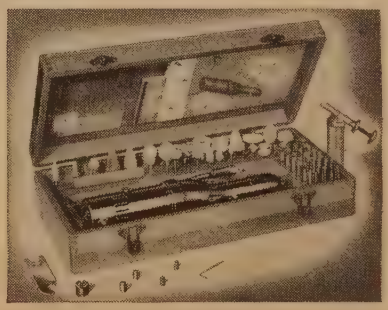
GRINDS
MILLS
DEBURRS
ENGRAVES
POLISHES
FINISHES

PRECISE 40

1/5 H. P.—40,000 R. P. M.

Dozens of applications—use it for faster, smoother work on steel, iron, bronze, brass, aluminum, plastics, wood, rubber, glass and most other materials.

Speed with power with precision—that's the new PRECISE 40. Surpasses our own PRECISE 35 which outworked every tool in the field. In strong, light plastic case, PRECISE 40 weighs only 40 oz.—packs a record 1/5 H.P. New type quill mounts precision collet chuck or grinding wheel arbors of various sizes; push-button spindle lock for quick tool change. 90% greater cooling; four oversize ball bearings. Quickly lubricated by pressure gun through ball-valve inlets. Tool mounts in vise, lathe, stand, or milling machine or can be used with PRECISE accessories for special applications. Guaranteed shockproof without ground wire.



Write TODAY FOR HELPFUL NEW CIRCULAR

PRECISE PRODUCTS COMPANY

1322 CLARK STREET • RACINE, WISCONSIN

PRECISE 40

HANDS *of Skill* DEMAND THE BEST

THERE'S A RIGHT GLOVE FOR EVERY JOB...MADE BY RIEGEL

Whatever the job — husking corn — puddling steel — sinking oil shafts — wherever skilled hands work — they demand the best in protection.

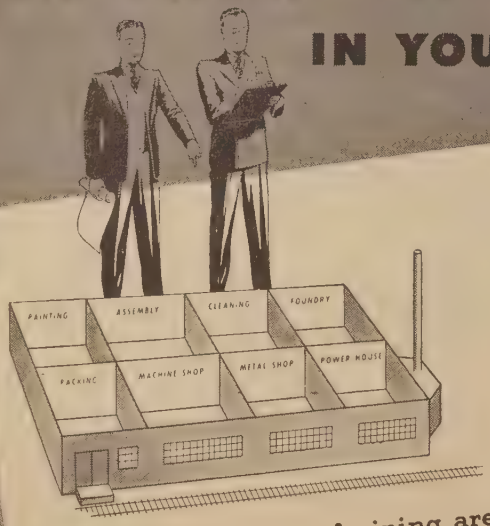
And that's where Riegel's WAGON BRAND Work Gloves come in. For Riegel makes *only* the *best* in value. Each pair is designed for wear — with plenty of ease and comfort — strength and protection to spare.

WAGON BRAND Work Gloves are the product of one of America's largest textile mills. They are Riegel-controlled — in one plant — from raw cotton to finished gloves. That's the kind of close supervision of detail that means unbeatable quality, durability, economy. Write to

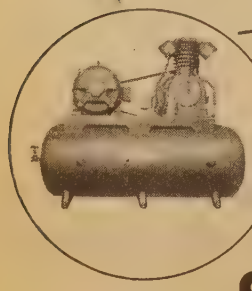
RIEGEL TEXTILE CORPORATION
342 Madison Avenue, New York 17, N. Y.

Wagon
Riegel Brand WORK GLOVES

HOW CAN YOU *Save* AIR VOLUME AND PRESSURE IN YOUR PLANT?



1. What lengths of piping are now servicing your plant? _____
2. What pressure are you losing through these trunk lines? _____
3. How many production hours would you lose if your compressor should break down? _____
4. How much in power costs are you paying to operate your present equipment? _____



A Kellogg-American

ON-THE-SPOT AIR SURVEY WILL TELL YOU

● Factual answers to questions like those above will determine if your compressed air system is losing money by producing air that is wasted. Do you know how every department can get adequate air volume at the right pressure whether one department, two, or the whole plant is operating? How pipeline air losses are eliminated? How plant shutdowns due to compressor failure are prevented? Helpful information on these problems, and details on the Kellogg-American "On-the-Spot Air" survey are available to you in a pamphlet. Write for your copy. *American Brake Shoe Company, Kellogg Division, Department M-2, Rochester 9, N. Y.*

AMERICAN Brake Shoe COMPANY — KELLOGG DIVISION

Plant Equipment Previews

(Continued from page 244)

JANUARY, 1947
PEP 98

CABLE LIFT DEVICE

Selection Board's Opinion: Easily adjustable for various angles.

Manufacturer: Rapids-Standard Co., Inc., Grand Rapids, Mich.

Features: Presents new freedom, greater ease and increased safety in adjusting the operating pitch of the power belt conveyor, while stacking materials at various levels. The constant pitch adjustments previously required much manual effort. These are now eliminated and operator does not support any part of the equipment. A few turns on the lifting crank handle do the trick.

JANUARY, 1947
PEP 99

GANTRY HOIST

Selection Board's Opinion: Portable and lightweight.

Manufacturer: LaRay Engr. & Equipment Co., 1029 N. 7th St., Milwaukee 3, Wis.

Features: Available in several sizes, this all-welded tubular steel, portable, gantry hoist has a lifting capacity of 6000 lbs at the maximum span and each standard is equipped with 4 heavy duty ball-bearing casters for fast easy mobility. Three heights are available: 8, 9 and 10 ft. each.

JANUARY, 1947
PEP 100

CONVEYOR WORK TABLE

Selection Board's Opinion: Has many possible uses.

Manufacturer: Island Equipment Corp 101 Park Ave., New York 17, N. Y.

Features: An all-purpose conveyor work

(Continued on page 218)

LEAK PROOF! PERMANENT!

Watson-Stillman Drop Forged Steel Fittings
Socket Welding Type
2000, 3000, 4000 and 6000 lb.
Cold Working Pressure

Watson-Stillman Socket Welding Fittings are especially designed for welding and conform to the proposed American Standards. They are easy to use and will greatly simplify difficult piping installations through their clean outside welds.

Three simple steps: (A) Cut pipe to size and insert in fitting. Deep socket supports and aligns the pipe, eliminating tack welding and the use of special fixtures. (B) Make a clean outside-the-pipe fillet weld. Position of weld prevents welding icicles inside pipe—no clogged lines. (C) The fitting and pipe are fused into one integral unit permanently tight and leak-proof. Unaffected by vibration, distortion and shock. (D) Unrestricted flow.

These fittings are for use with Schedule 40, Schedule 80, Schedule 160 and Double Extra Strong Pipe. Each class is made in Carbon Steel, Carbon Molybdenum Steel, Chromium Molybdenum Steel and various types of Stainless Steel.

Get the complete story on Socket Welding and Screw End Fittings by requesting Bulletin A-3. The Watson-Stillman Co., Roselle, New Jersey.

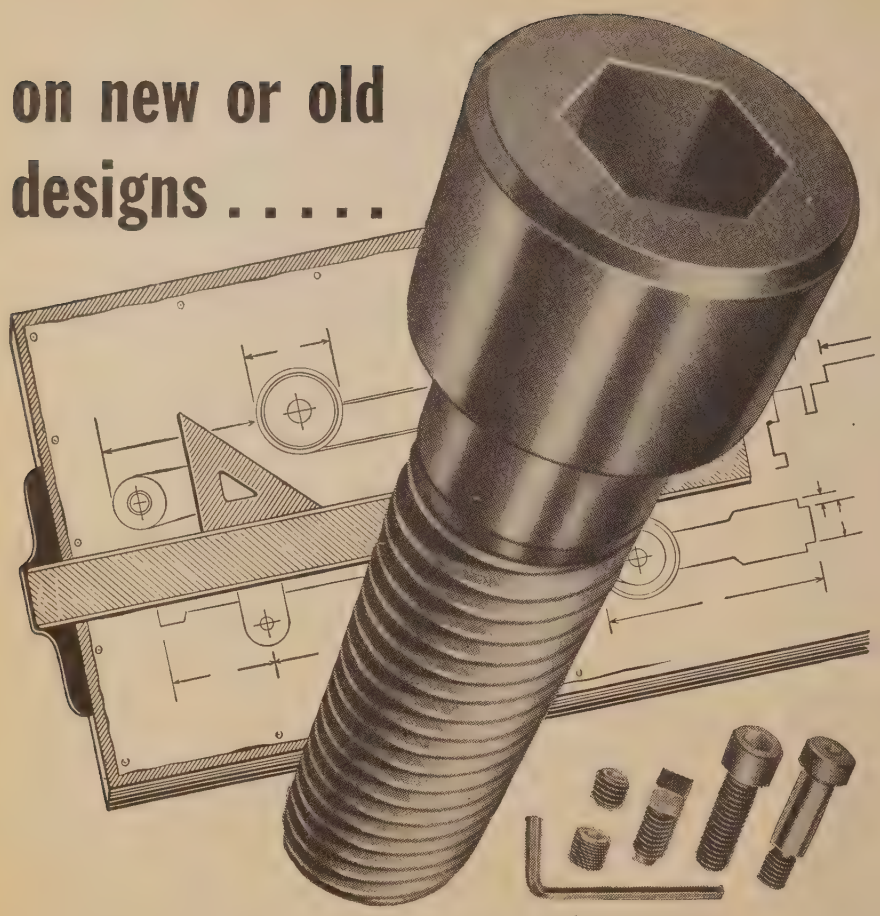
Sold Through Leading Distributors

Designers and Manufacturers of Forged Steel Fittings, Valves, Wire Rope Shears, Hand Pumps, Jacks, Pipe Benders and Hydraulic Equipment

WATSON - STILLMAN CO.
ROSELLE • NEW JERSEY
Sold Through Leading Distributors

1276

on new or old designs . . . . .



CHICAGO "Safety Plus" means extra holding power

Precision-made Chicago "Safety Plus" Products are the solution to many current production problems.

Exacting inspection standards insure sharp, full threads, uniform pitch diameter and clean true sockets. "Safety Plus" Products are manufactured from the finest selected heats of electric furnace alloy steel which provides added strength, toughness—and EXTRA holding power.

These outstanding features combine to make a truly fine product—ideally suited to modern production methods.

These Fine Products are sold only thru Authorized Distributors

CHICAGO "Safety Plus" line includes:

- Socket Head Cap Screws
- Socket Set Screws
- Stripper Bolts
- Square Head Dog Point Set Screws
- Socket Pipe Plugs
- Keys for "Safety Plus" Products

Complete line includes:

- Hexagon Head Cap Screws
- Square Head Cup Point Set Screws
- Headless Set Screws
- Fillister Head Cap Screws
- Flat Head Cap Screws
- Taper Pins
- Milled Studs
- Semi-Finished Hexagon Nuts
- Semi-Finished Hexagon Castellated Nuts

THE CHICAGO SCREW CO.
ESTABLISHED 1872
1026 So. Homan Avenue Chicago 24, Ill.

Plant Equipment Previews

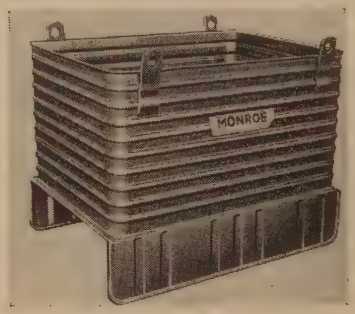
(Continued from page 246)

table for assembly, inspection, and packaging operations, it can be assembled in as many units as desired. It can be lengthened, shortened, or moved with ease and speed, and side leaves can be added or removed on either side. This flexibility is due to the unitized "bolted" construction. Power operating costs only from 2 to 3 cents an hour.

JANUARY, 1947
PEP 101

MATERIALS HANDLING EQUIPMENT

Selection Board's Opinion: Strong and light in weight.



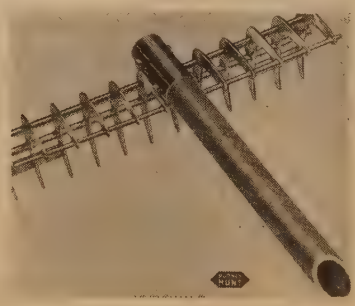
Manufacturer: Monroe Auto Equipment Co., Monroe, Mich.

Features: Manufactured of high tensile steel, the line consists of six products in various standardized sizes to include a total of 14 units of platforms, nestling rings, boxes, skids and pallets. The use of high tensile steel instead of the customary hot rolled low carbon steel has effected some 30% reduction in the weight of all the equipment.

JANUARY, 1947
PEP 102

TRASH RACKS AND RAKES

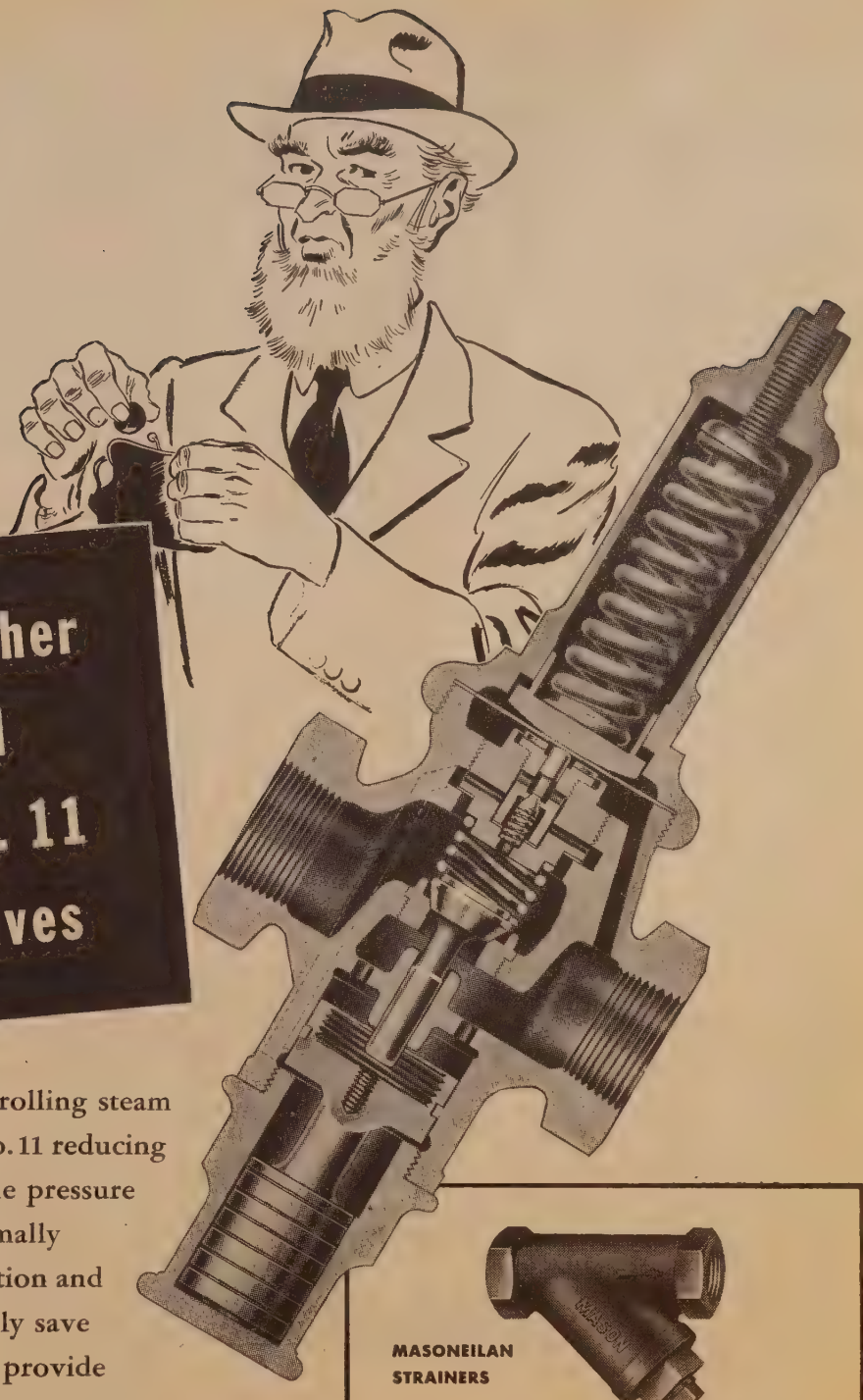
Selection Board's Opinion: Self-lifting feature a recommended quality.



Manufacturer: Rodney Hunt Machine Co., Orange, Mass.

Features: Trash rack has an all-welded back bar construction, superior to old spool and rod arrangement. Can be quickly installed in sections by tack welding or clipping and bolting the adjoining back bars. The stainless steel trash rake has revolutionary self-lifting feature, requiring only a small pull to bring it to top of the rack for each unloading.

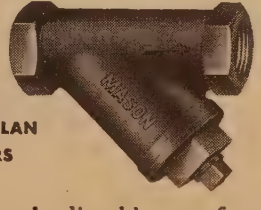
(Continued on page 250)



Mr. Pennypincher Has a Rival In MASON No. 11 Reducing Valves

When it comes to controlling steam pressures, you'll find that Mason No. 11 reducing valves provide accurate, dependable pressure control under all conditions normally encountered. Their sturdy construction and simple operating mechanism not only save you money by reducing waste but provide long life and cut maintenance costs as well.

Write for Catalog 73. It gives complete information on the Mason No. 11 as well as other types of Masoneilan reducing valves and regulators.



MASONEILAN STRAINERS

Prevent scale, dirt chips, etc. from damaging regulator, traps, valves and pumps with Masoneilan strainers. They eliminate maintenance delays and save money.

MASON-NEILAN REGULATOR CO.

1183 ADAMS STREET, BOSTON 24, MASS., U. S. A.

MASONEILAN

New York Philadelphia Pittsburgh Cleveland Chicago Tulsa Atlanta
St. Louis Houston Los Angeles San Francisco Mason Regulator Co. of Canada, Ltd., Montreal, Canada

RUST-PROOF
•
DUST-PROOF
•
Ideal for "TOUGH" Conditions

Here's a new addition to our regular line . . . "Red Wheel" Portable Conveyors are corrosion-proof, made specially for damp or dusty locations. They are INTERCHANGEABLE with the standard Buschman Conveyors, Couplings, Stands and other accessories. "Red Wheel" Conveyors are not affected by moisture, dust, grit or fumes. To assure rust protection, wheel tread and hub are heavy zinc-plated, side disk is red baked enamel. Full ball bearing is sealed against harmful elements. For information on this and standard conveyors—write for Bulletin 10.

Representatives in principal cities

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4405 CLIFTON AVE. CINCINNATI 32, OHIO

You'll Save 30%* or more
by using only GENUINE
Clipper Belt Hooks with
Modern Clipper Belt Lacers
*TIMKEN ROLLER BEARING CO. AND OTHERS EFFECT THIS SAVING IN BELT LACING COST.
In over 30 years experience manufacturing belt lacing equipment *exclusively*, Clipper has developed the world's finest belt hooks. To get the best service from these top quality hooks apply them with a modern belt lacer such as the Clipper No. 9 Portable. This combination will save you money. See your Mill Supply Jobber for demonstration.
CLIPPER BELT LACER COMPANY, GRAND RAPIDS 2, MICHIGAN
Clipper
BELT LACING EQUIPMENT
LISTED UNDER RE-EXAMINATION SERVICE UL UNDERWRITERS' LABORATORIES, INC.

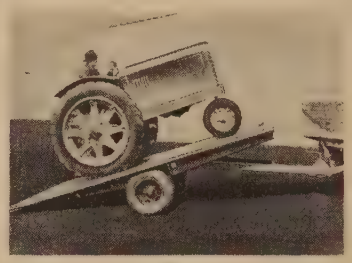
Plant Equipment Previews

(Continued from page 248)

JANUARY, 1947
PEP 103

TWO-WHEEL TRAILER

Selection Board's Opinion: Simplifies many handling jobs.



Manufacturer: C. N. Monroe Mfg. Co., Flint, Mich.

Features: Incorporates a tilting platform and a patented load-levelling hitch. Enables one man to load heavy objects, with easy connection to hauling unit and quick levelling of load for road travel. Tilting platform measures 8' x 14" and is available in either welded steel or hardwood plank construction. Can handle loads up to 8000 lbs.

JANUARY, 1947
PEP 104

CABLE CLAMPS

Selection Board's Opinion: Provide simple insulated clamping.

Manufacturer: Unistrut Products Co., 1049 W. Washington St., Chicago, Ill.

Features: This clamp for cables, conduit, pipe or wires is installed by simply locating it at desired point on a Unistrut Hollow-Square where it is fastened by tightening single bolt. Porcelain insulator is omitted for conduit or pipe.

JANUARY, 1947
PEP 105

GUARDED TRUCKS

Selection Board's Opinion: Desirable where there is danger of falling objects.

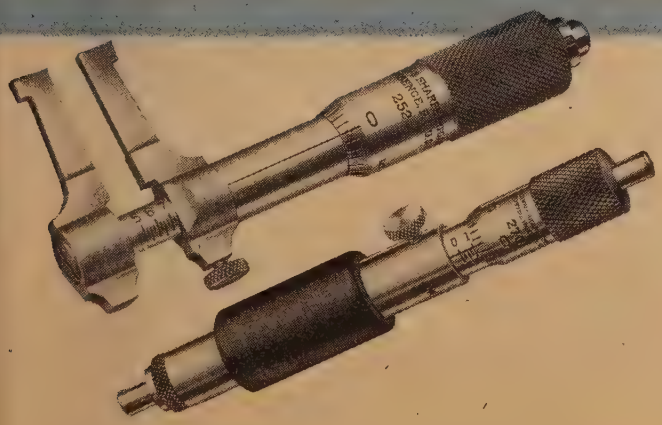
Manufacturer: Towmotor Corp., 1226 E. 152nd St., Cleveland 10, Ohio.

Features: Offered for installation on current models of the maker's trucks in service or as original equipment on new trucks, these overhead guards are fabricated of 2" front sections which telescope over 1½" side members with transverse lengths of the same size tubing notched and arc-welded into place.

(Continued on page 252)

PRIDE OF THE MACHINIST

since apprentice days



Inside Micrometers, Nos. 252 and 270, shown above, are a part of the wide line of Brown & Sharpe Machinists' Tools which include rules, combination squares, bevel protractors, straight edges, vernier tools, dial test indicators and many others.

B·S

We urge buying through the Distributor

• Whether it's the machinist's own micrometer or one issued to him from the tool crib, a Brown & Sharpe tool is an old friend. That's more than familiarity. It is respect for a tradition of fine precision tool making that goes back almost to the beginning of American industry. It is the knowledge of how precisely Brown & Sharpe makes tools . . . of such details as the end-to-end accuracy of the micrometer screw, the easily read graduations and figures and the care that's taken to make accuracy last through the long life of the tool. Such tools have always been the wisest possible tool investment. Brown & Sharpe Mfg. Co., Providence 1, Rhode Island, U. S. A.

BROWN & SHARPE TOOLS

When sales are endangered because of production difficulties, get materials, replacement parts, tools, dies, and needed machinery the *fastest* way! Specify Air Express!

No supplier or wholesaler is more than a matter of hours away when you specify Air Express delivery. And the costs are surprisingly low — drastically reduced from pre-war rates. Let Air Express solve your shipping problem — how to get it or deliver it quickly! Use this high-speed service to keep production flowing — and profits up!

Specify Air Express-a Good Business Buy

Shipments go everywhere at the speed of flight between principal U. S. towns and cities, with cost including special pick-up and delivery. Same-day delivery between many airport towns and cities. Fastest air-rail service to and from 23,000 off-airline communities in the United States. Service direct by air to and from scores of foreign countries in the world's best planes, giving the world's best service.

RATES CUT 22% SINCE 1943 (U. S. A.)					
AIR MILES	2 lbs.	5 lbs.	25 lbs.	40 lbs	Over 40 lbs. Cents per lb.
149	$1.00	$1.00	$1.00	$1.23	3.07¢
349	1.02	1.18	2.30	3.68	9.21¢
549	1.07	1.42	3.84	6.14	15.35¢
1049	1.17	1.98	7.68	12.28	30.70¢
2349	1.45	3.53	17.65	28.24	70.61¢
Over 2350	1.47	3.68	18.42	29.47	73.68¢
INTERNATIONAL RATES ALSO REDUCED					

AIR EXPRESS

GETS THERE FIRST

Write Today for the Time and Rate Schedule on Air Express. It contains illuminating facts to help you solve many a shipping problem. Air Express Division, Railway Express Agency, 230 Park Avenue, New York 17. Or ask for it at any Airline or Railway Express office.

Phone AIR EXPRESS DIVISION, RAILWAY EXPRESS AGENCY
Representing the **AIRLINES** of the United States

Plant Equipment Previews

(Continued from page 250)

JANUARY, 1947
PEP 106

INDUSTRIAL WHEEL

Selection Board's Opinion: Light weight and long life.

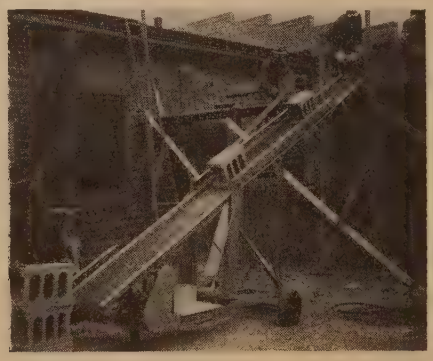
Manufacturer: Northrop Gaines, Inc., 1985 E. 16th St., Los Angeles 21, Cal.

Features: Tested for strength and wearability for transportation of heavy loads.

JANUARY, 1947
PEP 107

PORTABLE CONVEYOR

Selection Board's Opinion: Light weight and portability a recommendation.



Manufacturer: Standard Conveyor Co., 600 Second Ave., North St. Paul, Minn.

Features: Electrically operated, this portable conveyor conveys, elevates and stacks. Will lift concrete blocks to working levels on one-story buildings. Adjustable boom extends up to 10½ ft in height; stacks as high as 14 ft. Conveyor handles individual items up to 100 lbs.

JANUARY, 1947
PEP 108

CLAMP

Selection Board's Opinion: Assures good grip.

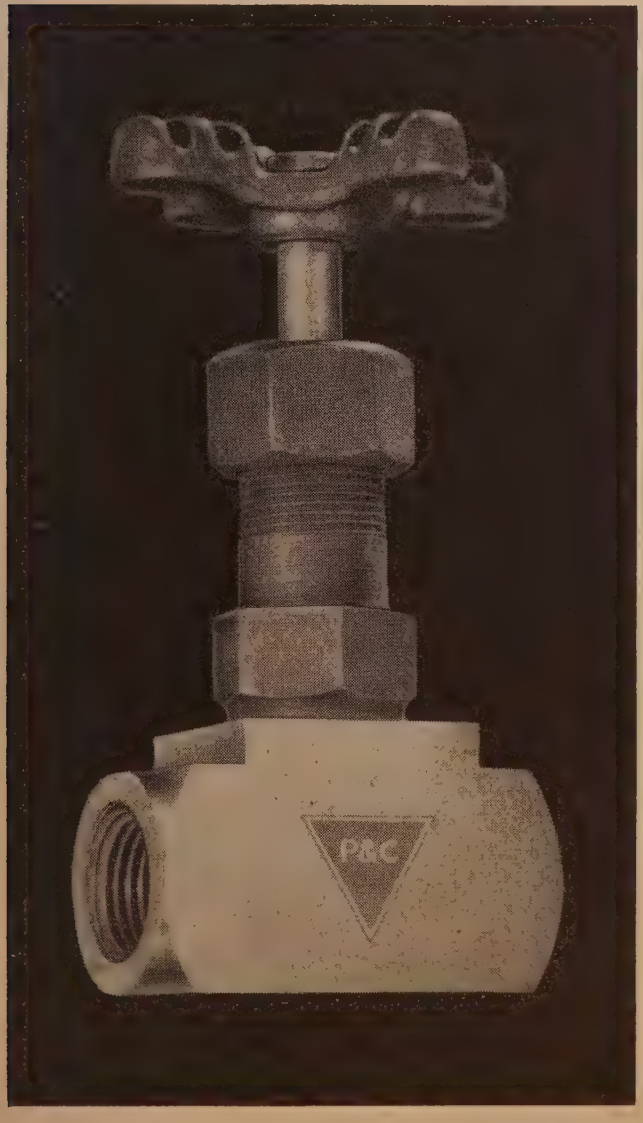
Manufacturer: Merrill Brothers, 55 Arnold Ave., Maspeth (Brooklyn), N. Y.

Features: A powerful drop forged clamp, whose gripping power increases according to the weight lifted. Will pick up in any position or at any angle doing away with need for two types of clamps.

Continued on page 254)

"BAR STOCK" VALVES MAKE LASTING FRIENDS FOR READING-PRATT & CADY

These tough little globe and angle valves are machined from highest quality bar stock—bronze, carbon steel or alloy steel. Working pressures range from 4000 pounds at 150° F. to 475 pounds at 1000° F.



READING, PENNSYLVANIA—When Bar Stock Valves were first developed by R-P & C, they were introduced as close control valves. They are that. But that's only part of the story. Users of valves in large quantity have come to know Bar Stocks as general purpose valves. Whether the application calls for normal regulation, shut-off, or close control, Bar Stocks do a dependable job. And, because of the method by which they are made, they are economical to buy—sound value for the money.

Bar Stocks are typical of READING-PRATT & CADY'S line of high quality products. Consider R-P & C as a single responsible source for bronze, iron and steel gate, globe, angle and check valves—for cocks and Lubrotite gate valves—cast steel fittings.

This leaflet gives highlight facts about Bar Stock Valves. Just ask for DH-1323.

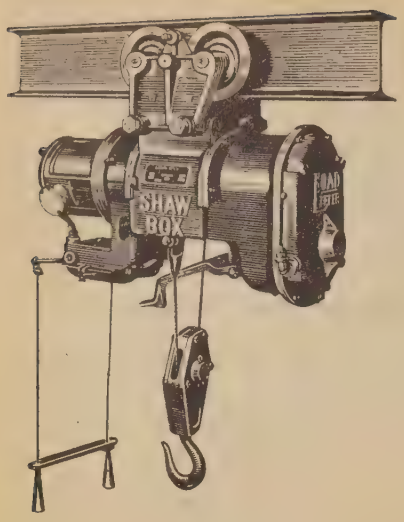
ACCO

Reading-Pratt & Cady Distributors Are Located in Principal Cities

Reading, Pa. • Atlanta • Baltimore • Boston • Chicago • Denver • Detroit • Houston • Los Angeles • New York • Philadelphia • Pittsburgh • Portland, Ore. • San Francisco • Bridgeport, Conn.

TRADE MARK

READING-PRATT & CADY DIVISION
AMERICAN CHAIN & CABLE



Champion!

No matter how grueling the lifting job, how many working hours a day, or how near capacity each load is, the 'Load-Lifter' Electric Hoist takes the punishment and is ready for more.

This ruggedness of 'Load-Lifter' Hoists is only part of their story. Special features, not found in their entirety in any other electric hoist, are largely responsible for the long, trouble-free service you may be sure of getting when you use a 'Load-Lifter.'

It has no fancy gadgets needing perpetual attention. The fundamental design is good, the construction is sturdy, and simplicity is its keynote.

If you have a tough, continuous lifting problem, give it to the 'Load-Lifter' and then forget about it!

Write us, giving details of the lifting problems facing you. Our engineers will recommend the correct installation for your particular needs.

'Load-Lifter' Electric Hoists are built with lifting capacities of 500 to 40,000 lbs. in all combinations required for industrial needs. They are adaptable to almost every working condition within their capacities. Send for Catalog No. 215.

MAXWELL MANNING M&M MOORE INC. TRADE MARK

'LOAD LIFTER' *Hoists*

MANNING, MAXWELL & MOORE, INC.
MUSKEGON, MICHIGAN

Builders of 'Shaw-Box' Cranes, 'Budgit' and 'Load Lifter' Hoists and other lifting specialties. Makers of Ashcroft Gauges, Hancock Valves. Consolidated Safety and Relief Valves and 'American' industrial instruments.

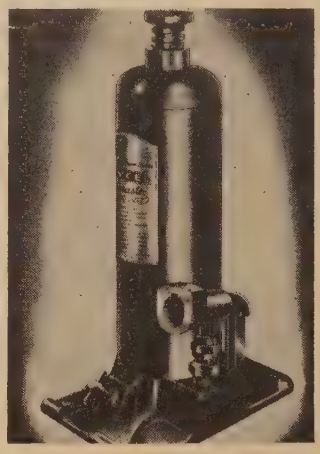
Plant Equipment Previews

(Continued from page 252)

JANUARY, 1947
PEP 109

HYDRAULIC JACKS

Selection Board's Opinion: Easy to operate.



Manufacturer: The Joyce-Gridland Co., Dayton 3, Ohio.

Features: The base is of forged steel and pump piston of tool hardened steel with pump cup packing of finest quality giving as near a leak-proof construction as is possible to build. Five models with 3, 5, 8, 12, 20, 30 tons capacity respectively.

(Continued on page 258)

REPLACE DANGER with SAFETY

DIETZ LANTERNS

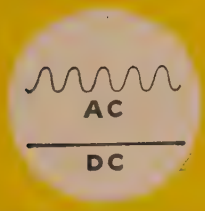
Place DIETZ LANTERNS on guard for every emergency use. They faithfully guide the way, night after night, without diminishment of light.

DIETZ LANTERNS will not fail or falter as long as a drop of oil remains to burn. Many models will give light and safety for an entire weekend with plenty of kerosene left to spare.

Keep your DIETZ LANTERNS in good service—ready for use the moment needed.

Do not gamble with light and safety. DIETZ LANTERNS [and ROAD TORCHES] give dependable light with safety—for over a century.

1840 R.E. DIETZ COMPANY 1947
NEW YORK
OUTPUT DISTRIBUTED THROUGH THE JOBBING TRADE EXCLUSIVELY



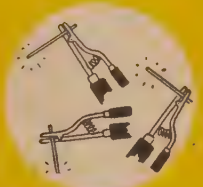
AC OR DC — Yes, whatever your machines, AC or DC, whatever your work, "SM" performs perfectly. It's the true production electrode for welding thin gauge metals.

LOWER PENETRATION — You get less penetration—the *desired* amount of penetration with "SM." Gone are your troubles of "burn-throughs" and "suck-ins." Use "SM" on metals down to 20 gauge.

"DROP OFF" SLAG — A really unusual and important feature of "SM" — main reason why one of America's largest light gauge fabricators uses it exclusively. Slag removal is no problem with its "drop off" characteristic.

"SM" gives you—

CONVINCE YOURSELF—TRY "SM"

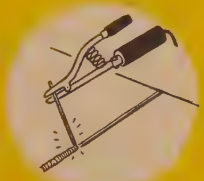


ALL-POSITION — Whatever you're fabricating — auto or truck bodies, tanks, furniture, window frames, etc., you can weld them in any position. All-position welding rounds out "SM's" versatility — makes it an electrode you can't afford *not* to use.

SPRAY TYPE ARC—Specially developed coating gives "SM" *ideal* concentrated spraying action for faster, smoother, stronger welds on all positions.

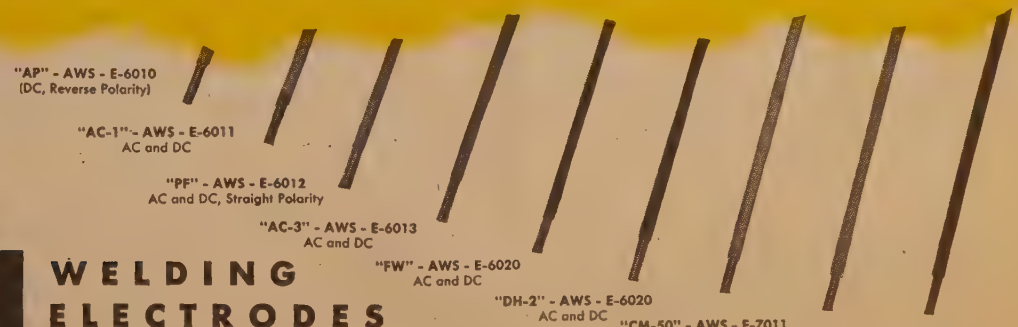
OTHER POPULAR P&H MILD STEEL ELECTRODES

There's a production approved electrode for every requirement in the complete P&H line. Below are just a few. Get complete information from your P&H representative or write us.



REDUCED SPATTER LOSS—The extremely small amount of spatter greatly increases welding efficiencies of "SM."

FLAT, THIN BEAD — Another important advantage: Its very smooth, flat bead. Say goodbye to "humped" or convex bead that requires expensive grinding, careful finishing.

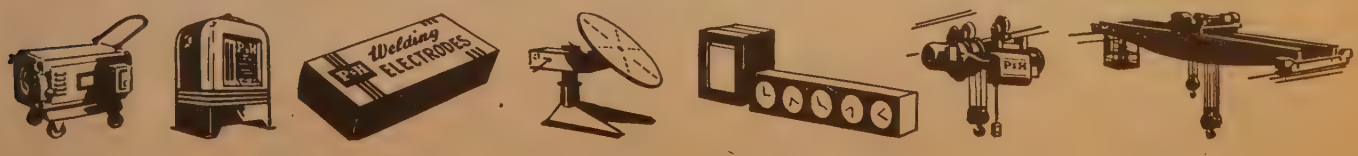

"AP" - AWS - E-6010
(DC, Reverse Polarity)
"AC-1" - AWS - E-6011
AC and DC
"PF" - AWS - E-6012
AC and DC, Straight Polarity
"AC-3" - AWS - E-6013
AC and DC
"FW" - AWS - E-6020
AC and DC
"DH-2" - AWS - E-6020
AC and DC
"CM-50" - AWS - E-7011
AC and DC
"AW-4" - AWS - E-10012
AC and DC
"AW-2B" - AWS-E-10020
DC, Reverse Polarity

P&H HARNISCHFEGER CORPORATION
WELDING ELECTRODES • MOTORS • HOISTS • ELECTRIC CRANES • ARC WELDERS • EXCAVATORS

WELDING ELECTRODES
4565 West National Avenue
Milwaukee 14, Wisconsin

Also a complete line of P&H Electrodes for stainless and alloy steels, as well as for hard surfacing.

AMERICA'S MOST COMPLETE ARC WELDING SERVICE.



DC Welders · AC Welders · Welding Electrodes · Welding Positioners · Welding Production Control Systems · Electric Hoists · Electric Cranes

SMOOTH ACTION

CANTOL BELT WAX means smooth acting belts, more power, longer belt life. Smooth running belting increases production and profits.

CANTOL helps to hold production schedules UP, while maintenance costs are held down. Here is a treatment for all types of belting that seals out injurious foreign matter, that contains no harmful ingredients, that gives belts friction to pull the load and keeps them strong and flexible.

Cantol Belt Wax is a product of

CANTOL WAX COMPANY, Bloomington, Indiana

Sold in every state—through distributors and dealers.

Cantol

FROM OLD MEXICO comes Candelilla Wax. Properly combined and rightly blended with other ingredients, it becomes CANTOL, the different and better belt dressing.

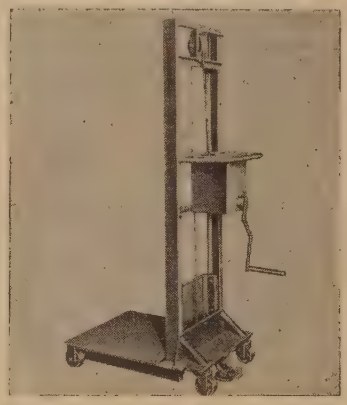
Plant Equipment Previews

(Continued from page 254)

JANUARY, 1947
PEP 110

SHOP LIFTER

Selection Board's Opinion: Many possible uses.



Manufacturer: Domestic Industries, Inc., Albion, Mich.

Features: This portable elevator is ideal as a die table, a lifter and transporter of heavy fixtures or for tiering boxes. The listing platform is cranked up and down, while a specially designed automatic clutch locks the load in any position. Overall ht., 6′; lift of platform, 4′8″ from floor; lowered ht. of platform, 5½″; platform size, 24 x 24″, capacity, 500 lbs; shipping wt., 260 lbs.

JANUARY, 1947
PEP 111

LIGHT DUTY GRAVITY CONVEYOR

Selection Board's Opinion: Many possible applications.

Manufacturer: Island Equipment Corp., 101 Park Ave., New York.

Features: Employs unique bearing that adds to ease with which rollers turn, increasing efficiency of conveyor. Units are supplied in various lengths, capable of being quickly coupled into continuous unit for conveying straightaway or around curves.

JANUARY, 1947
PEP 112

RUBBER TIRED WHEELS

Selection Board's Opinion: Light weight and useful for many purposes.

Manufacturer: Firtz Ziebarth Co., Box 1029, Rialto, Cal.

Features: A line of 96 different styles and sizes to choose from, including Deluxe ball bearing, standard ball bearing, DeLuxe Sleeve oilless bearing, and Standard Sleeve bearing wheels. Available in steel or plastic.

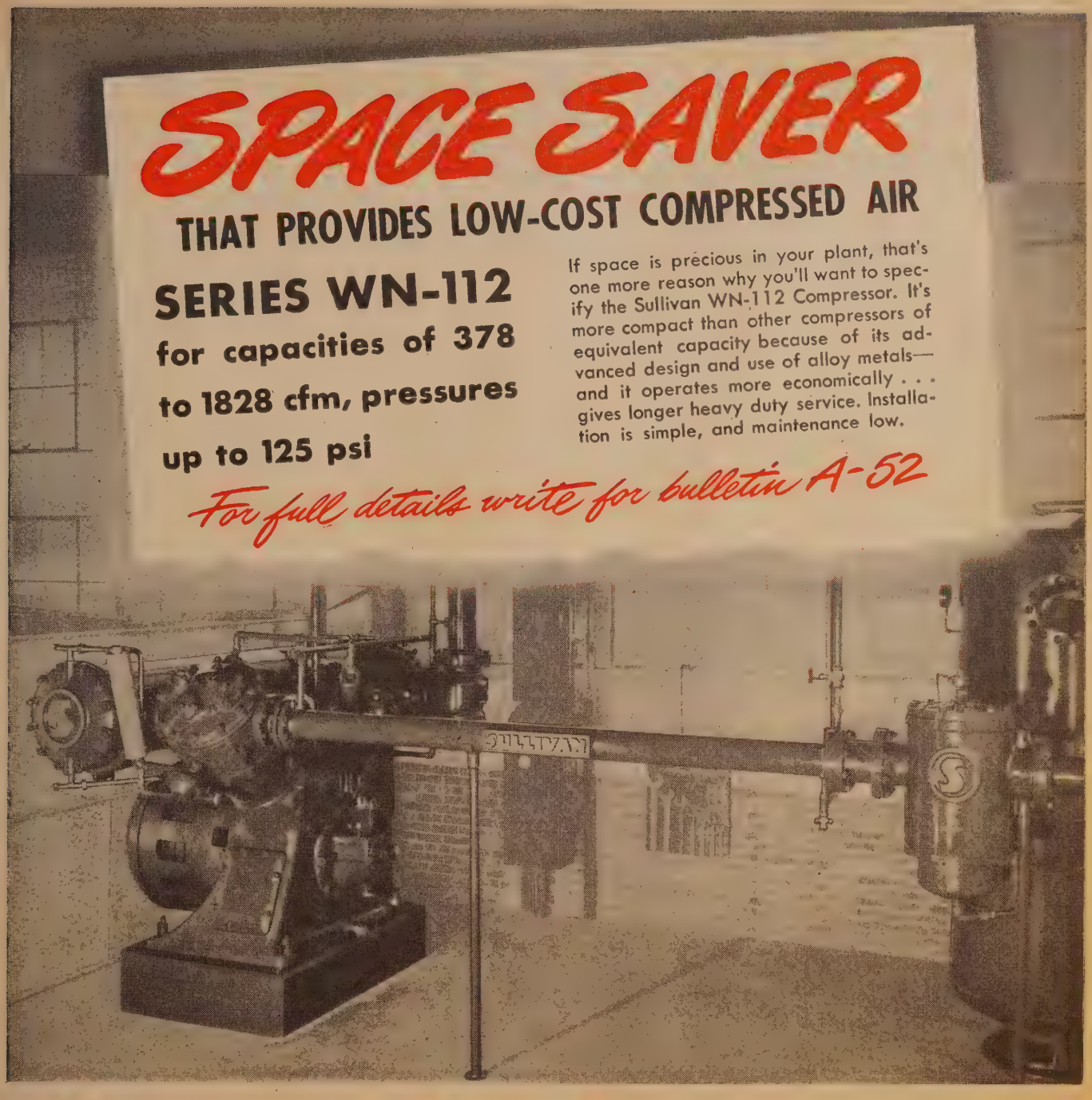
JANUARY, 1947
PEP 113

SLING KITS

Selection Board's Opinion: A complete set for light loads.

Manufacturer: Wire and Cable Div., Wind Turbine Co., West Chester, Pa.

(Continued on page 260)


SPACE SAVER
THAT PROVIDES LOW-COST COMPRESSED AIR
SERIES WN-112
for capacities of 378 to 1828 cfm, pressures up to 125 psi
If space is precious in your plant, that's one more reason why you'll want to specify the Sullivan WN-112 Compressor. It's more compact than other compressors of equivalent capacity because of its advanced design and use of alloy metals—and it operates more economically . . . gives longer heavy duty service. Installation is simple, and maintenance low.
For full details write for bulletin A-52

Sullivan Air Compressors

PORTABLE AND STATIONARY — ¼ HP TO 600 HP

ALWAYS DEPENDABLE!

W&D 1512

Consult a Joy Engineer

SULLIVAN DIVISION

JOY MANUFACTURING CO.

GENERAL OFFICES: HENRY W. OLIVER BLDG., PITTSBURGH, PA.

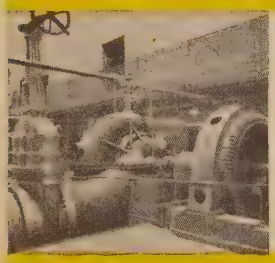
INDUSTRY BANS RUST AND CORROSION with Everlasting Fastenings

Few industries can escape the destructive effects of rust and corrosion but *all* industries can reduce their costly ravages in maintenance and breakdown.

Here are five industrial applications where Harper's EVERLASTING FASTENINGS have licked rust and corrosion.

MONEL STOPS CORROSIVE CHEMICALS

Problems in salt production have been solved by using Monel bolts. In mining, treating and handling of many chemicals, non-ferrous alloys are the answer to efficient operation.

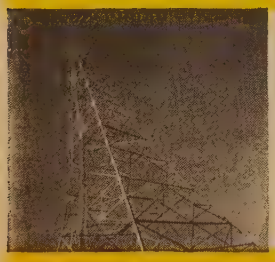


BRASS GUARDS WATER SYSTEMS

In valves and pumps that compose the heart of water works, Brass fastenings help in eliminating the most common cause of replacement—rust.

STAINLESS STEEL SOLVES OIL PROBLEMS

Acids and gases at high temperatures attack metal but Stainless Steel alloys cut refinery replacements to a minimum, assure years of continued operation.



UTILITIES CHOOSE SILICON BRONZE

Weather is the bug-a-boo in power lines and other utility applications. Silicon Bronze Bolts reduce season "cracking" and maintenance costs.

NAVAL BRONZE WINS ON SEA

Marine applications demand high strength plus resistance to salt air and water. Naval Bronze fastenings have proved their dependability in marine diesels and ship fittings.

Call upon Harper to solve your fastening problems in your industry.

THE H. M. HARPER COMPANY
2617 Fletcher Street, Chicago 18, Ill.
Branch Offices: New York City, Philadelphia, Los Angeles, Milwaukee, Cincinnati, Dallas
Representatives in Principal Cities

HARPER
Everlasting Fastenings
Chicago

Plant Equipment Previews

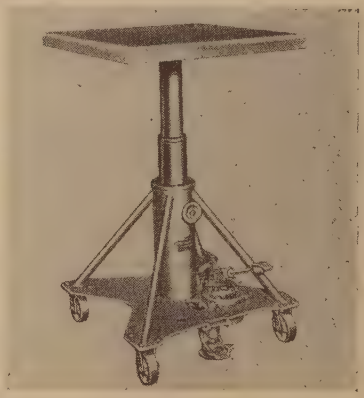
(Continued from page 258)

Features: Designed for ½ ton and 1 ton loads, kits provide 3 slings and 3 types of interchangeable standard accessories for any lifting job. Included are slings for choker hitch, bale handling, moving machinery, skids, and for handling number of small parts.

JANUARY, 1947
PEP 114

PORTABLE HYDRAULIC ELEVATING TABLE

Selection Board's Opinion: A very handy device.



Manufacturer: Lyon-Raymond Corp., 448 Madison St., Greene, N. Y.

Features: This hydraulic elevating table incorporates a telescopic cylinder to meet the frequent demand for a range of elevation not obtainable with standard construction. The telescopic cylinder makes possible an elevating range from 28" to 50" or a total lift of 22".

JANUARY, 1947
PEP 115

TOW CABLE

Selection Board's Opinion: Quick connecting features are outstanding.

Manufacturer: Wind Turbine Co., West Chester, Pa.

Features: Sturdy jaws secured by cold forged, rust resisting, cable connectors clamp round any bumper and are secured simply by tightening a single wing nut to a snug hand fit. No additional tools needed. Minimum breaking strength: 2000 lbs.

(Continued on page 262)

"Thine alabaster cities gleam"

In *all* the world, *only* in America can be found so great and shining cities.

They are, in one, both the symbol and the accomplishment of our aspirations. They are, in a way, America. Ask a couple of million returned GIs!

If beyond our alabaster cities we sense the roar of mighty machinery, the belching stacks of industry, the skill and sweat of human beings . . . they obscure not at all the handiwork. For in America we know that not alone with ideals, but with the "sterner stuff" of toil and resources shall a nation be moulded at last.

So, some practical dreamer it was, who watched the first *steel pipe* clank from the grimy benches about sixty years ago. Who, in shaping the hot metal, gave form and substance to fair cities yet to arise . . . cities that became realities because these *arteries* of steel could convey water, oil and other essential fluids, gas, steam and even some forms of solids, over long distances and to great heights.

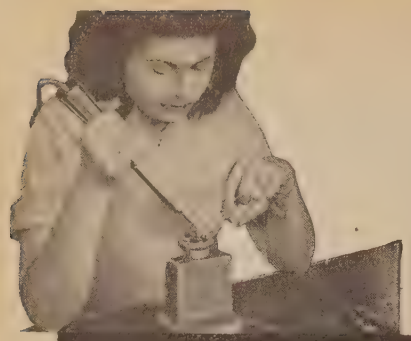
Actually, the achievement of the modern city directly parallels the development and plentiful production of reliable, economically adaptable *steel pipe.* Yes, *steel pipe makes it possible!*

The interesting story of "Pipe in American Life" will be sent upon request.

Committee on Steel Pipe Research
OF
AMERICAN IRON AND STEEL INSTITUTE
350 FIFTH AVENUE, NEW YORK 1, N. Y.

STEEL PIPE MAKES IT POSSIBLE!

. . . better living through pipes of steel for plumbing and heating purposes.



Is your soldering equipment OUTDATED?

Kwikheat is as modern as tomorrow—the only soldering iron with built-in thermostat plus the many other valuable features shown below. Compare your present soldering equipment with Kwikheat and you'll agree—from tip to plug Kwikheat is in a class by itself!

List . . $11.00

KWIKHEAT is modern in every respect!

- HOT IN 90 SECONDS
- HEAT CONTROL BUILT-IN
- SAFE . . . CAN'T OVERHEAT
- LESS RETINNING NEEDED
- LIGHT WEIGHT—13½ OZ.
- COOL PROTECTING HANDLE
- HEAVY POWER—225 WATTS
- EXTRA-DURABLE TIPS

SIX TIP STYLES

Each $1.25

KWIKHEAT
THERMOSTATIC SOLDERING IRON
Kwikheat Division - Sound Equipment Corp. of Calif.
1593 San Fernando Rd., Glendale 4, Calif.

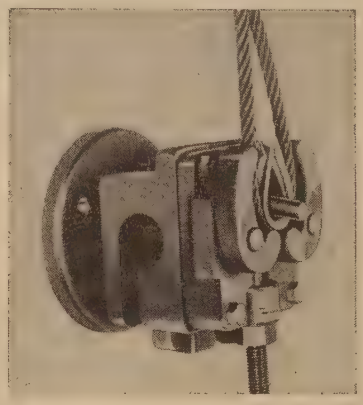
Plant Equipment Previews

(Continued from page 260)

JANUARY, 1947
PEP 116

VISE

Selection Board's Opinion: Greatly facilitates handing of wire rope.



Manufacturer: The Nunn Mfg. Co., 2125 Dewey Ave., Evanston, Ill.

Features: This vise forms a loop in wire rope by simply turning one hex unit with an ordinary wrench. Vise automatically compensates for rope size within its designed range and holds loop firmly through the splicing or clamping operations.

(Continued on page 264)

Widely Used to Keep Count!

Industry's favorite "Watchdog of Production" since 1906 . . . Redington Counters are widely used on punch presses, pumps, screw machines, packaging machines . . . conveyor lines, can making and box making machinery . . . in fact, all types of machinery . . . and production lines. Easy to install . . . 100% accurate. Write for new catalog.

F. B. REDINGTON CO.

106 So. Sangamon St. Chicago 7, Ill.

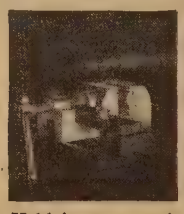
"YANKEE" VISES

Give *Start-to-finish* work holding

Off the swivel base, end down for accurate marking.

Back on the swivel base, at the bench, for center punching.

Lifted onto drill press, still accurately in position.



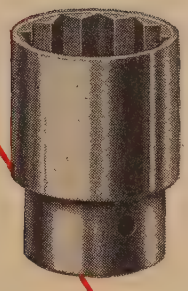
Held in same position but moved to milling machine.

Take a job through every step without a misstep . . . faster, easier . . . in a "Yankee" Vise. Work lined up accurately from bench to drill press, to milling machine and back to bench. Lifts off and on a swivel base at the bench. Vise squared on top, bottom, sides and front end for machine work. Easily made into handy, economical jig. Hardened steel block, V-grooved, provided with each "Yankee" Vise. Four sizes, with and without swivel base . . . 1½", 2", 2¾" and 4" jaw widths. Your industrial distributor carries the full line. **"Yankee" Tool Book FREE!**

YANKEE TOOLS NOW PART OF
STANLEY
THE TOOL BOX OF THE WORLD

NORTH BROS. MFG. CO.
Division of The Stanley Works
Philadelphia 33, Pa.

New



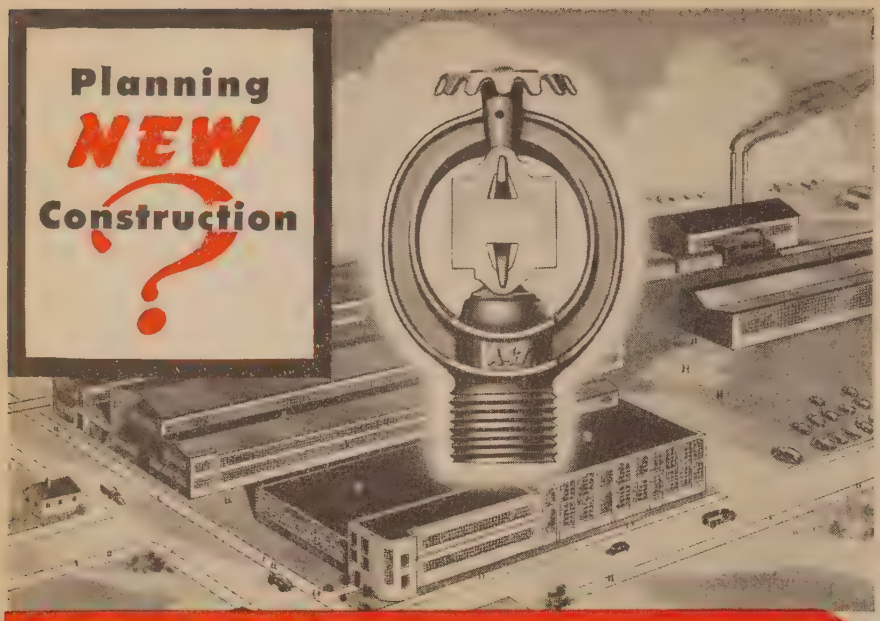
HOT FORGED

SOCKETS

by

BILLINGS

THE BILLINGS & SPENCER CO. HARTFORD 1, CONN., U. S. A.



PrePLAN your fire protection

"Automatic" FIRE-FOG
• IT BLANKETS • IT ISOLATES • IT QUENCHES •

— a famous member of the "Automatic" Sprinkler Family. Provides adequate protection for quench tank, transformer, oil line and other fires of flammable liquid origin.

IF you're planning new construction or the remodeling of your existing facilities, adequate defense against fire must receive primary consideration. For the very structure of business enterprise is dependent upon continuity, and *fire can destroy that continuity with deliberate suddenness*

Today's business executives are aware more than ever before of the wisdom of safeguarding lives and property. They, too, are quick to recognize the advantages of "Automatic" Sprinkler protection, industry's most effective weapon against fire . . . and this recognition did not come overnight. It is the result of more than half a century of pioneering and leadership in the design, engineering, and construction of approved fire extinguishing devices and systems which *must* and *do* meet the approval of all leading fire insurance bureaus.

• Want further information on automatic sprinkler protection? Your telephone will quickly reach an "Automatic" Sprinkler Engineer located in the principal cities of North and South America, or write "Automatic" Sprinkler Corporation of America, Youngstown 1, Ohio.

"Automatic" Sprinkler devices and systems are listed by Underwriters' Laboratories, Inc., and approved by Factory Mutual Laboratories.

FIRE PROTECTION
DEVELOPMENT ENGINEERING
"Automatic" Sprinkler
MANUFACTURE INSTALLATION
"AUTOMATIC" SPRINKLER CORPORATION OF AMERICA
YOUNGSTOWN 1, OHIO
OFFICES IN PRINCIPAL CITIES OF NORTH and SOUTH AMERICA

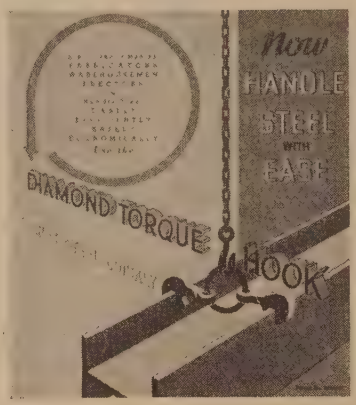
Plant Equipment Previews

(Continued from page 262)

JANUARY, 1947
PEP 117

TORQUE HOOK

Selection Board's Opinion: Facilitates handling structural shapes.



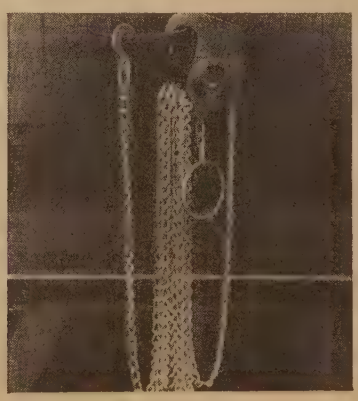
Manufacturer: Elizabeth Iron Works, Green Lane, Elizabeth, N. J.

Features: A one-operational lifting device, applying simple principle of torque action to do its work. The grips of the hook become stronger as the load becomes greater. With its use it is now possible to lift and nest-stack steel shapes in one operation.

JANUARY, 1947
PEP 118

CAR DOOR OPENER

Selection Board's Opinion: Facilitates opening of obstinate doors.



Manufacturer: The Mining Safety Device Co., Bowerston, Ohio.

Features: One man can open and close the most obstinate freight car door, quickly and safely, instead of taking several men off their work to tug and yank. It often saves its small low cost in the first hour of use.

JANUARY, 1947
PEP 119

HYDRAULIC FLOOR CRANES

Selection Board's Opinion: Versatile units.

Manufacturer: Ruger Equipment Co., P. O. Box 3821, Portland 8, Ore.

Features: Three models designed to meet

(Continued on page 266)

T/W -----SEAM WELDING----------

FASTEST PRODUCTION METHOD OF MAKING PRESSURE-TIGHT JOINTS

"We have found seam welding a practical and efficient method of fabricating cylindrical containers, particularly where large volume production is necessary." . . . The Aro Equipment Corporation, Bryan, Ohio.

Taylor-Winfield makes seam welders in many sizes . . . throat depths 18" to 60" . . . transformers 50 to 500 KVA. Write or phone Taylor-Winfield for interesting production data based on your products.

When you want to join metal like this or this or any number of different shapes, you can do it faster and better on a production basis with seam welding.

You can seam weld, either circumferentially or longitudinally, as slow as 12" per minute or as fast as 360" per minute. You can space the welds intermittently or overlap them to produce a pressure-tight seam. Either way, the Taylor-Winfield Seam Welder will turn out the same quality of weld time after time, hour after hour, day in and day out . . . automatically.

On products requiring both circumferential and longitudinal seams, Taylor-Winfield can equip your welder with swinging lower arms and a swiveling upper head. Then you can switch easily from one operation to another. . . . Just as you can seam weld many different shapes of products, so can you seam weld many different metals . . . carbon and stainless steels, zinc and other coated steels, nickel alloys, weldable bronzes and aluminum.

Try this fast production method. Taylor-Winfield sales engineers can give you all the facts and figures on seam welding or any of the other forms of resistance welding . . . spot, flash-butt or projection. Write or phone Taylor-Winfield.

The TAYLOR-WINFIELD CORPORATION
WARREN . . . OHIO

TAYLOR-WINFIELD RESISTANCE WELDERS

New! CHIKSAN XH

(FOR A HIGH PRESSURE)

SWIVEL JOINTS

FORGED STEEL

for WORKING PRESSURES to 12,000 psi

The new forged steel CHIKSAN XH Swivel Joint combines the easy turning and effective pack-off — for which all CHIKSAN Joints are noted — with high capacity. Built of forged steel, with flame-hardened races, this new CHIKSAN Joint is designed for heavy duty services of all kinds. It makes possible the fabrication of all-steel lines with perfect flexibility, yet capable of withstanding working pressures to 12,000 psi... with greater safety and longer life. Engineering data on request.

In addition to the new CHIKSAN XH forged steel Swivel Joint, there are over 500 different Types, Styles and Sizes available for pressures from 300 to 3000 psi, and temperatures to 500° F.

REPRESENTATIVES IN PRINCIPAL CITIES

EXPORT REPRESENTATIVE: Chiksan Export Co., Brea, Calif.

Branches: New York 7, Houston 2

CHIKSAN

BALL BEARING SWIVEL JOINTS FOR ALL PURPOSES

CHIKSAN COMPANY

BREA, CALIFORNIA

New York 7 Houston 2

Plant Equipment Previews

(Continued from page 264)

the lifting needs of every shop. Sturdily built and of 1, 2, or 3-ton capacity it enables any shop lifting job to be done by just one man. Big roller bearing wheels carry the load easily to any spot on the shop floor where the hydraulic control takes over to "spot" the load with precision.

JANUARY, 1947

PEP 120

CARBOY TRUCK

Selection Board's Opinion: Facilitates handling of carboys.

Manufacturer: Palmer-Shile Co., 7112 West Jefferson Ave., Detroit 17, Mich.

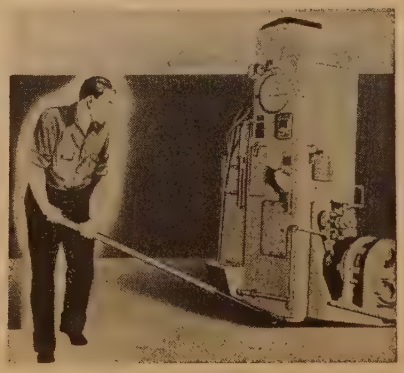
Features: Loading becomes automatic when truck is rolled against carboy and gripping yoke is dropped over the top, and then truck handles are pulled back. All steel construction with overall width of only 20". Roller bearing wheels; capacity 500 lbs; weight 75 lbs.

JANUARY, 1947

PEP 121

LIFTING BAR

Selection Board's Opinion: Easy to handle and use.



Manufacturer: Arnolt Motor Co., Warsaw, Ind.

Features: Enables one man to lift a 5-ton load. Has hardened steel roller for extra leverage and ledges for safe gripping. Furnished in 3 styles of interchangeable toe plates: Notched for prying up spikes, etc., straight-edged for lifting and moving; straight-edged with rubber coating to prevent scratching finished surfaces.

ments of "CM" engineers. Ordinary sling chains were subject to fatigue... an internal crystallization that developed with time and use and became a constant menace to the safety of men and materials. Columbus-McKinnon engineers set to work to correct this grave danger. Out of the "CM" laboratories came America's first alloy steel chain...a chain that eliminates the threat of fatigue. And as an added dividend to the chain user, it was found that HERC-ALLOY would outlast ordinary chain 4 to 5 times.

Comet electric hoists announced in 1940 and the Meteor in 1942 represented noteworthy advances in the development of overhead materials handling equipment. These hoists presented many exclusive and unusual features. Comet and Meteor hoists are but two products of Chisholm-Moore's continuing program of research and development. Even now, testing is completed on another hoist which will introduce more "CM" exclusive hoisting equipment advantages. As soon as materials become available in quantity this unusually efficient hoist will be made available in several capacities.

Over the years Columbus-McKinnon chains and Chisholm-Moore hoists have developed world-wide recognition. Countless companies have standardized on "CM" products to gain the benefits of new developments and to enjoy the security of quality production.

The "CM" distributing organization has been built up gradually over a long period of time. It includes leading mill supply houses who through their years of experience with "CM" products are competent to advise on the selection and application of hoists and chains to meet every requirement efficiently and safely.

CM

Watch this Electric Hoist cut handling costs

CM METEOR

SEE the speedy Meteor in action and you'll agree that materials handling costs are down for the full count. This heavy duty electric hoist is an outstanding performer... a time and money saver. Helical gears, airplane type cooling, low headroom, thermal protection, only 110 volts at push button station...and speed...are but a few of the Meteor's notable features. Bulletin 142 will tell you about all of them. Better still, the Meteor itself will bring you all of them.

Capacities from ½ ton and up. Lifting speeds from 18 to 60 feet per minute.

CHISHOLM-MOORE HOIST CORPORATION

(Affiliated with Columbus-McKinnon Chain Corporation)

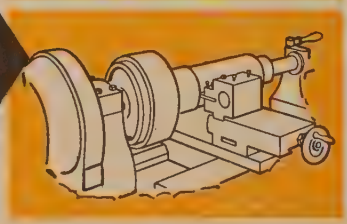
GENERAL OFFICES AND FACTORIES: TONAWANDA, N. Y.

SALES OFFICES: New York • Chicago • Cleveland • San Francisco • Los Angeles

The Difference in BEARINGS

BEGINS WITH THE ALLOY

INCLUDES MACHINING



AND ENDS WITH *Performance*

Look at the photomicrographs above. Note the homogeneous grain structure, the smaller matrix size, the lack of large lead crystals in Shook bronze as compared to ordinary bronze. That's because Shook uses Radial Grain Control . . . a method of die-casting that increases strain resistance without increasing hardness. Machining Shook bronze bars is easy. They come to you pre-machined . . . concentric . . . ready for your finish cut to size or oversize. As for performance . . . try Shook bars . . . they're guaranteed to stand up in your service. Ask your dealer for them. Write for Catalog 45 which lists all stock sizes.

GUARANTEE

Shook Bronze Bars are guaranteed to give complete satisfaction and to machine to the sizes stamped on them. Any Shook product will be replaced free if it fails to give full satisfaction.

BUSHINGS • BAR STOCK • BABBITTS

SHOOK BRONZE

CORPORATION

GREENLAWN AND LAKE STREETS • LIMA, OHIO

SB-121

How To Do It

(Continued from page 174)

69. HOISTS—Outstanding features, applications, specifications, etc., of electric hoists are described in bulletin #838. Shown are monorail trolley hoists; hoists with motorized 2-wheel drive, floor controlled, double truck trolleys; hoists with trailer cabs; units with 4-wheel drive trolleys, and others. Application photos shown; specifications and special features listed. Euclid Crane & Hoist Co.

70. CONVEYORS—Interesting presentation gives case histories with dollars-and-cents savings in different industries and shows actual installation photos of Conveyors. Other usable data includes typical conveyor layouts and sketches showing articles handled on main types of conveyors. Logan Co.

71. GAS POWERED TRUCK—24-page bulletin is devoted to features of a gas-powered fork lift truck. Powered by Ford 4-cylinder truck engine, it has 8 roller fork carriage in hydraulic lift assembly; all-welded construction, no rivets. Oil pressure used for tilting forward and backward; oversize drive wheels and tires provide traction and smooth riding; has 6-blade radiator fan. Service Caster & Truck Div., Domestic Industries, Inc.

72. TRUCKS, CASTERS, DOLLIES — Catalog #44 concerns platform trucks which may be chosen for particular job by selecting any chassis or running gear and any of more than 1000 superstructures. Also shown are hand trucks; wagon trucks, trailers, dollies, 2-wheel trucks,, casters and wheels. Thomas Truck & Caster Co.

73. INDUSTRIAL TIRES Industrial pneumatic tires for materials handling equipment are presented in bulletin #3215. Service combination of rugged pneumatic tire with separate inner tube is offered. Wide-base rim plus principle of dual wheels allows extra load capacity formerly thought too heavy for pneumatic tires. General Tire & Rubber Co.

74. HANDLING EQUIPMENT — Comprehensive 76-page, color brochure #22 is devoted to cranes, floormasters, hand trucks, jackmaster, pallets, power fork trucks, skid platforms, stackers, storage racks, wheels, and other labor savers. Is profusely illustrated. Lewis-Shepard Products Inc.

75. STORAGE BATTERIES — Useful information on care and feeding of storage batteries is included in maintenance manual #BD-336B for company's motive power and rubber jar batteries. Has sections on theory (what is inside a battery, etc.), installation, operation, charging and maintenance. Philco Corp.

76. ELECTRIC HOIST—Bulletin #7171-A presents small electric hoist said, despite its compactness and economy, to sacrifice nothing for safe and dependable service. The practically square hoisting unit is designed to operate vertically or horizontally. Are designed for general utility work, not for delicate speed control. Robbins & Myers, Inc.

77. CASTERS—A visual index (pictures of each type of caster), an index by product, and index by series numbers are given in catalog #155 on casters. Following these

(Continued on page 272)

New Motor Controls Catalog

Send this Coupon

for your up-to-date listings of Motor Controls, — Manual and Magnetic Starters, Push Button Stations and Enclosed Switches, — including basic *new principle* Magnetic Controls, just out!

To Industrial Control Division, Arrow-Hart & Hegeman Electric Company, Hartford 6, Conn.
Send your new 124-page MOTOR CONTROLS Catalog No. 10 to

(*Name*) _____

(*Company*) _____

(*Address*) _____

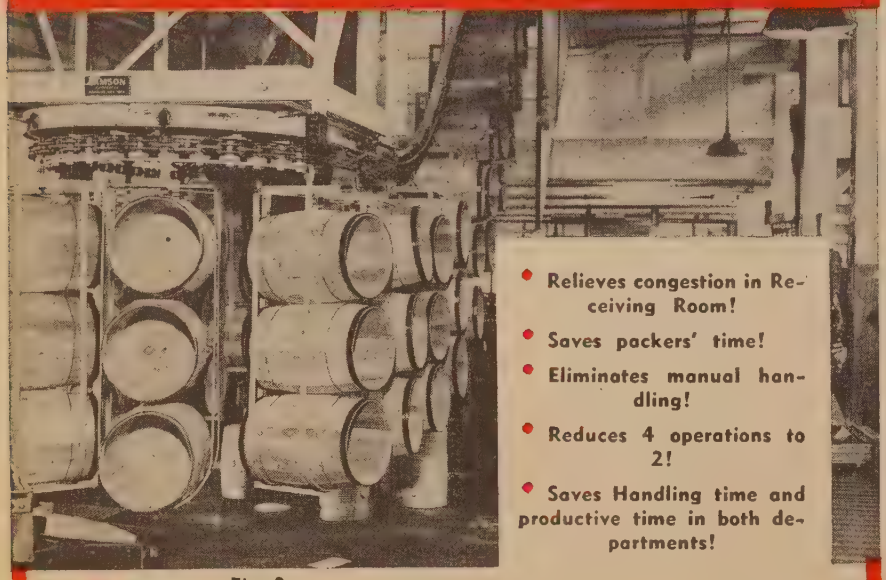
(*City & State*) _____

INDUSTRIAL CONTROL DIVISION

THE ARROW-HART & HEGEMAN ELECTRIC COMPANY, HARTFORD, CONN., U. S. A.

LAMSON OVERHEAD CONVEYOR PROVIDES FLOATING STORAGE

For 550 Kegs Between Receiving Room and Packing Department



- Relieves congestion in Receiving Room!
- Saves packers' time!
- Eliminates manual handling!
- Reduces 4 operations to 2!
- Saves Handling time and productive time in both departments!

Fig. 2

THE Lamson and Sessions Company, manufacturers of bolts, nuts, and hundreds of other metal fasteners, use about 550 12" kegs for each day's packing. Formerly, a truck brought them daily to an already crowded Receiving Room, and from there they were sent, 35 or 40 at a time, on a cleated belt conveyor, to the Packing Department. Upstairs, the kegs were carried 35 feet to the point of use. Lack of floor space prohibited more kegs being stored.

In conjunction with Lamson and Sessions engineers, LAMSON devised this Floating Storage on an Overhead Conveyor. Now the truckman unloads the kegs directly onto the conveyor (Fig. 1). They are carried up one flight, and across a balcony to an adjoining building, where they dip to a convenient height for the packers' use (Fig. 2). The system holds the daily requirement—550 kegs. No more congestion! No manual handling! 4 operations are cut to 2! No time is lost waiting for kegs when needed! Packers waste no time carrying kegs! This is a typical example of industrial saving and increased efficiency through LAMSON Mechanization.

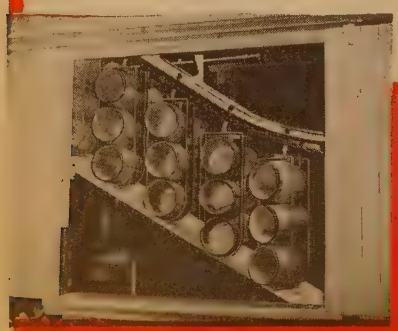


Fig. 1

★ Ask for Your **FREE COPY** of the new book "Utilize The Air Rights of Your Ceiling"

LAMSON CORPORATION
350 Lamson St., Syracuse 1, N. Y.

How To Do It

(Continued from page 270)

indices are detailed explanations and photographs of casters and their uses. Faultless Caster Corp.

78. CHAIN HOISTS—Presented in catalog #60 is comparison chart of chain hoist types with sketches to illustrate differences in lifting speed, maximum rated capacity, manpower, weight and cost between multiple gear, screw gear, and differential types. How to select a hoist, a 2-page selector table, and other detailed information given. Reading Chain & Block Corp.

79. ELECTRIC TRUCKS—Colorful 18-page brochure gives information and application photos of fork and ram, low-lift, high-lift, crane and platform trucks, and tractors. Special features of company's line of trucks are pointed out such as no-plug travel controller preventing accidental plugging from forward to reverse; safety interlock, auxiliary controller, etc. Baker Industrial Truck Div., Baker-Raulang Co.

80. STORAGE BATTERIES — Batteries for motive power applications are subject for catalog #100. Care and maintenance suggestions are given; 2 pages discuss theory of the lead acid storage battery; advantages are listed of storage battery propelled trucks; characteristics given of storage battery motive power. Gould Storage Battery Corp.

81. TRUCKS & TRACTORS Catalog #2500 has 23 pages of data on electric trucks and tractors, various models available. A truck for every type of duty—light, medium and heavy, is offered. Capacities range up to 10,000 lbs. Crescent Truck Co.

82. OVERHEAD CONVEYORS—"Utilize the 'Air Rights' of Your Ceilings" is bulletin #645-10M which points out advantages of overhead chain conveyors. Pictorial presentation shows varied applications of such conveyors and has accompanying explanatory text. Lamson Corp.

83. HAND TRUCKS — Variety of hand trucks for general and specific needs is presented in 56-page catalog #L-292. Explains lift jack system applied to receiving room operations to save time and space. Among many trucks described are those for drum handling, upending loaded barrels, heavy-duty, bag handling, moving furniture (furniture dollys), etc. The Colson Corp.

84. ANALYSIS GUIDE —"Materials Handling Analysis Guide" is manual to help determine the need, if any, for better materials handling methods in your organization. Booklet is prepared in lively style with illustrative sketches. Towmotor Corp.

85. LOGISTICS IN PAPER New 48-page brochure, "Industrial Logistics in Paper," #A-9570, tells story of materials handling procedures for the paper industry and how their load-movement problems have been solved. Photographs record story which should be real value to paper makers, converters and users. The evolution of pulp-handling entailing handling bales in 2000 lb. stacks on especially-designed blades using neither skids nor pallets is portrayed. The Elwell-Parker Electric Co.

86. BATTERIES—Batteries and the need for electric industrial trucks provide subject for 16-page bulletin #208. Operating char-

acteristics of the batteries and construction features are pointed out. Electric Storage Battery Co.

87. WIRE ROPE SLINGS—Wire rope slings most commonly employed and standard and special fittings are presented in 22-page manual, catalog #S-43. Included is table of recommended safe loads and dimensions of fittings. Tells how to calculate safe loads on slings. A. Leschen & Sons Rope Co.

88. TRUCKS— 56-page, tab-indexed catalog #15 describes 2-wheel and 4-wheel hand trucks, (heavy duty platform, light duty platform, baggage wagon and stake platform); and miscellaneous equipment such as lifts, jacks, skids, dollies, trailers, wheels and axles, casters, and other special trucks. The Howe Scale Co.

89. STORAGE— Benefits from better storage methods are outlined in bulletin #501 showing individual racks of heavy steel built in sizes to take boxes. Are claimed to: replace open pans in assembly work; take less space and bring parts nearer workman's hands; carry along parts in production; be ideal for laying out work in toolmaking; permit easy, quick inventory. Stackbin Corp.

90. BUCKETS— Catalog #425 gives application photos and descriptions of full line of buckets including rope reeve, power wheel, special purpose, open type grab, and link-type. Tells materials and conditions for which each bucket is best suited and distinctive features of each type. Industrial Brownhoist Corp.

91. WIRE ROPE SLINGS— 56 - page brochure #S-7 on slings and fittings of wire rope has 5 sections: braided slings of 8-part construction; braided slings designed for need of flat belt-like surface but retaining braided advantages; slings where high flexibility is not essential and use of single-part wire rope sling is desired; sling fittings and general information such as typical assemblies; crane signals and sling load chart. MacWhyte Co.

92. ENGINEERED HYDRAULIC DEVICES— Information folder contains several bulletins on materials handling equipment such as hydraulic high-lift trucks, foot and hand operated hydraulic pumps, die handling trucks, and various hydraulic devices such as custom-built presses, elevating, roller-top table, power fork tiering truck, high elevating turntable, etc. Bulletins are profusely illustrated. Lyon-Raymond Corp.

93. BULK MATERIALS—A system for handling of bulk materials from box car to storage bins, from any processing stage to another vertically or horizontally—and for use with all types of grinders, is presented in bulletin #PV-546. Said to assure handling without losses, without wear, with minimum of breakage, without dusting and without contamination. Sprout-Waldron & Co.

94. ROLLAWAY TRUCK—Bulletin describes truck specially designed for handling sheet metal, plate glass, plywood, plaster board, pipe tubing, and long flat cased materials. One man can load, move and store loads. Eliminates lifting. Beall Pipe & Tank Corp.

95. TRUCKS, WHEELS, CASTERS — Free wheeling tires, roller bearings and grease fittings are standard equipment for noiseless trucks described in catalog #42N. 36 pages are devoted to types of rubber tired wheels, casters (stem, double wheel swivel, formed steel plate, light duty, etc.), rubber bumpers, 2-wheel hand trucks, dollies, non-tilt trucks, etc. Nutting Truck and Caster

Available for Immediate Delivery

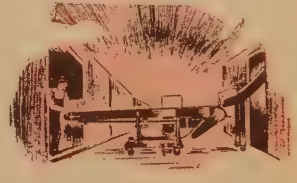
Cuts Handling Costs... Speeds Deliveries!

LAMSON UTILITY CONVEYOR
it's Portable...Adjustable...Reversible

MAIL the coupon today for folder showing the 101 uses of this handy conveyor. It shows how you can save time and labor in loading and unloading freight cars, trucks and planes . . . in stacking and unstacking cartons in your warehouse . . . how you can increase the travel of your gravity conveyors and feed an overhead conveyor at any point along the line.

Lamson Corporation—a pioneer manufacturer of materials handling conveyors—offers a limited quantity of this guaranteed utility conveyor for immediate delivery.

Helps you load and unload cars and trucks.



Spans dock from warehouse to freight car.

Acts as Booster between two portable, roller gravity conveyors.

SEND COUPON FOR FOLDER

Lamson Corporation
350 Lamson St.,
Syracuse 1, N. Y.

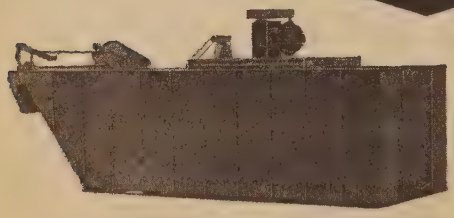
Send me, without obligation, your folder and prices on the Lamson Utility Conveyor.

Name.....

Company.....

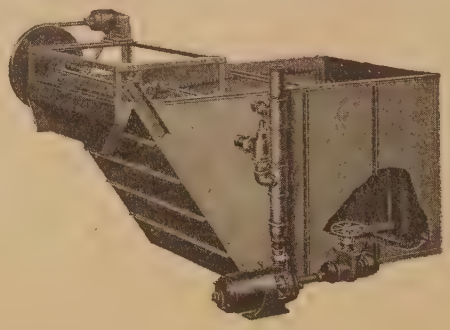
Address..... State.....

SAVE 1. ON PRODUCTION COSTS
2. ON MAINTENANCE COSTS
3. IN REDUCED REJECTS
WITH HOFFMAN
FILTRATION EQUIPMENT



FLOTATION EQUIPMENT

Hoffman flotation equipment provides a simple method of maintaining a full flow of clean coolant to the work. It is fully automatic, the system is compact and the action is entirely mechanical; no added material is necessary.



VACUUM FILTERS
UP TO 500 GALS. PER MIN.

Hoffman Vacuum Filters are self-cleaning, continuous-operating units that increase production, lengthen life of machines, cutting tools and grinding wheels plus the fact that they are easily installed.

PRESSURE FILTERS
FOR FINE FILTRATION

Designed for use with approved filter-aid powder, Hoffman Pressure Filters are widely used for filtering straight oil coolants — especially those of heavier viscosity — where finest clarity is required.

PLUS coolant temperature control units and vacuum stills for solvent recovery . . . and a specialized engineering service that solves your filtration problems.

● SEND FOR LITERATURE

U. S. HOFFMAN MACHINERY CORPORATION
213 Lamson St., Syracuse 6, N. Y.
COOLANT FILTERS • FILTRATION ENGINEERING SERVICE

(Continued from page 166)

profit levels of industry. The theme of speeches by union leadership was that unless this profit was redistributed, there would not be sufficient buying power for purchase of goods.

Altogether, much of the CIO talk was aimed at the general public. Usually, the sessions rate extensive front page coverage by practically every U. S. newspaper. During the sessions, the newspaper front pages were monopolized by John L.

● Central States Supply Meeting

J. H. Ruddell, vice president of Central Rubber & Supply Co., Indianapolis, Ind., is president of the Central States Supply Association.

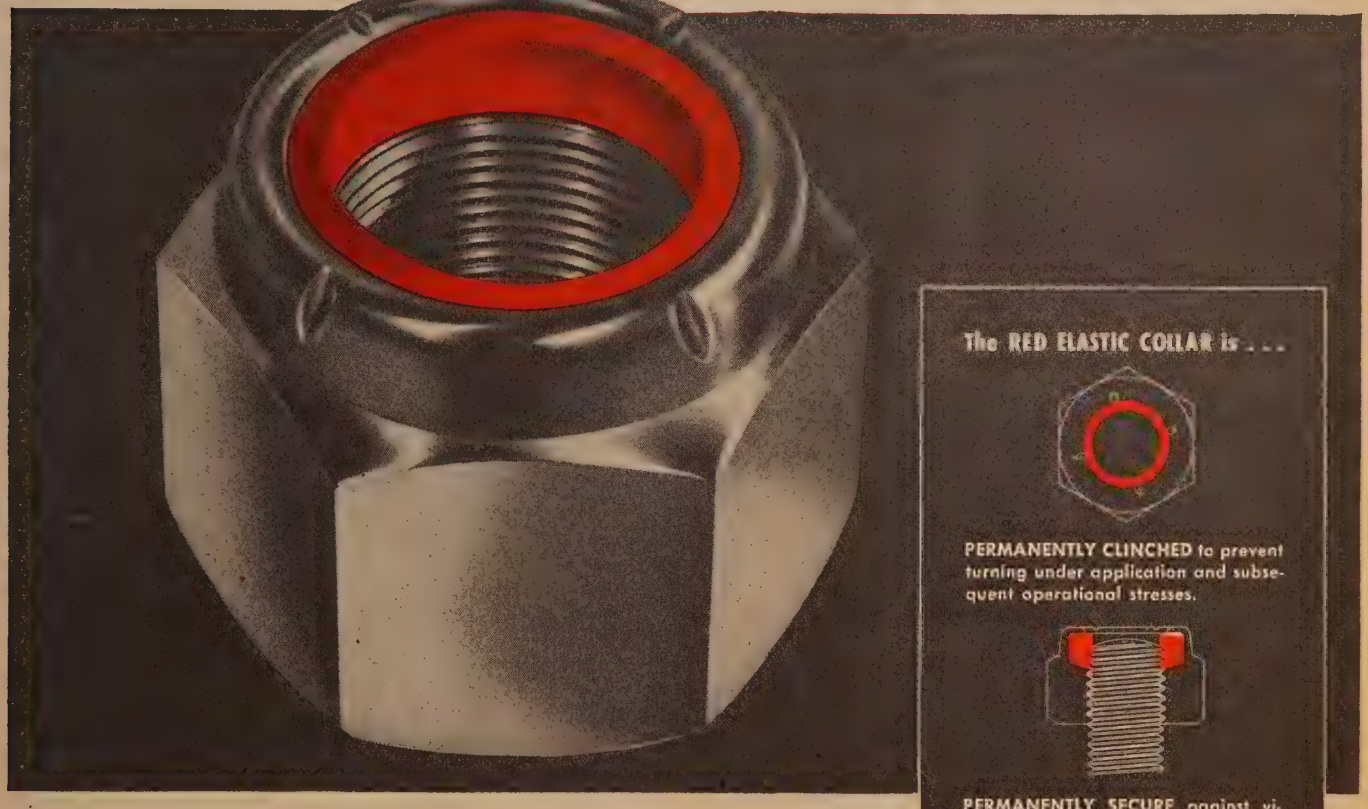
The annual meeting of the Central States Supply Association was held on November 18 and 19 at the Palmer House in Chicago. The meeting was attended by more than 400 distributors and manufacturers.

A portion of this meeting was devoted exclusively to a study and discussion of methods that would enable distributors to serve their industrial consumers more effectively. One of the highlights of the program was a clinic conducted by manufacturers and distributors in which such timely subjects as sales training, distributors' sales meetings, market evaluation as part of sales planning, better sales promotion, etc., were discussed by distributors and manufacturers.

These clinic programs were developed by J. G. Geddes, vice-president of H. K. Porter, Inc., and the principal participants were W. H. Gebhart, of Henry Disston & Sons; J. Tate, of The Dumore Co.; G. Vaughan, of The W. M. Pattison Supply Co., J. J. Simpson, of Pittsburgh Gage & Supply Co.; A. S. Gould, of The Oster Manufacturing Co.; K. R. Beardslee, of Carboloy Co.; M. I. Stray, of the J. Russell & Co.; H. E. Stvan, of Strong, Carlisle & Hammond Co.;

(Continued on page 276)

THE FAMOUS *Red Elastic Collar* IS A SYMBOL OF SECURITY



It makes ESNA *Elastic Stop Nuts Self-Locking, Self-Sealing and Reusable*

As a result, all ESNA Elastic Stop Nuts protect assemblies against the effects of: VIBRATION: Elastic Stop Nuts lock in position anywhere on a bolt or stud. Vibration. impact or stress reversal cannot disturb prestressed or positioned settings. . . . CORROSION: Elastic Stop Nuts keep the working threads on the bolt and nut bright and rust-free to protect their strength and permit easy removal without damage to the bolt. . . . THREAD FAILURE: Elastic Stop Nuts dampen impact stresses and materially reduce the shocks against bolt threads that frequently cause metal fatigue. . . . LIQUID SEEPAGE: Elastic Stop Nuts produce a radial-reactive pressure against the bolt threads inside the Red Elastic Collar that makes Elastic Stop Nuts self-sealing against liquid seepage. . . . COSTLY MAINTENANCE: Elastic Stop Nuts are reusable. (Torque tests on aircraft bolts prove that adequate locking torque is maintained through 15 on-and-off cycles.) They do not deform the bolt, damage the threads, gall the finish, or rust.

This wide range of protection permits full purchasing and inventory standardization and its resultant economy. For further information address: Elastic Stop Nut Corporation of America, Union, New Jersey. Sales Engineers and Distributors are conveniently located in many principal cities.

The RED ELASTIC COLLAR is . . .

PERMANENTLY CLINCHED to prevent turning under application and subsequent operational stresses.

PERMANENTLY SECURE against vibration effects. The bolt impresses (does not cut) full contact threads.

PERMANENTLY TIGHT against moisture. Bolt threads have 100% contact in collar — and a full metal seat.

REUSABLE. The Red Elastic Collar retains its grip after repeated usage.

ESNA ELASTIC STOP NUTS

TRADE MARK

INTERNAL WRENCHING

ANCHOR

WING

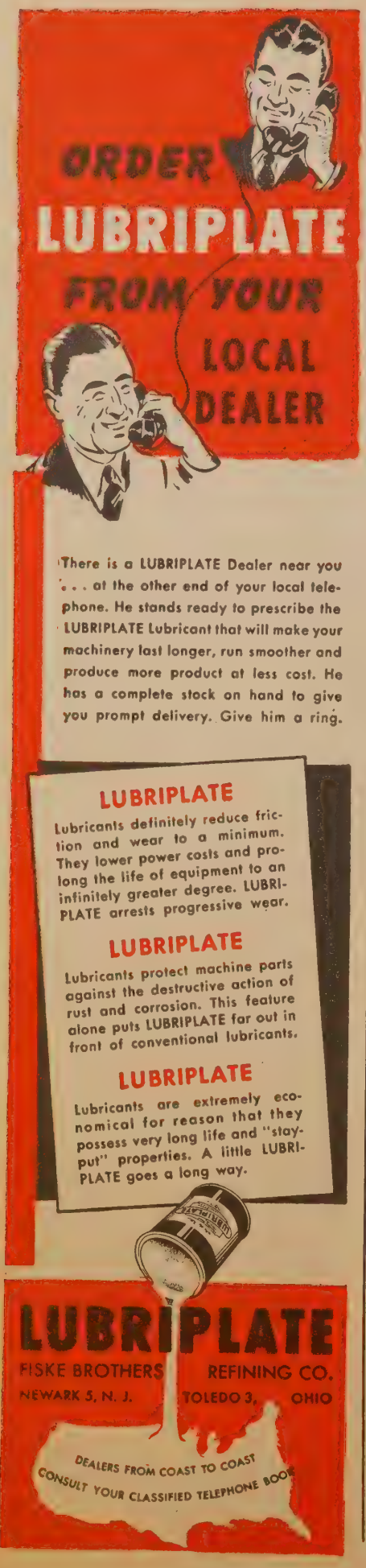
SPLINE

CLINCH

GANG CHANNEL

CAP

PRODUCTS OF: **ELASTIC STOP NUT CORPORATION OF AMERICA**


ORDER
LUBRIPLATE
FROM YOUR
LOCAL
DEALER
There is a LUBRIPLATE Dealer near you . . . at the other end of your local telephone. He stands ready to prescribe the LUBRIPLATE Lubricant that will make your machinery last longer, run smoother and produce more product at less cost. He has a complete stock on hand to give you prompt delivery. Give him a ring.
LUBRIPLATE
Lubricants definitely reduce friction and wear to a minimum. They lower power costs and prolong the life of equipment to an infinitely greater degree. LUBRIPLATE arrests progressive wear.
LUBRIPLATE
Lubricants protect machine parts against the destructive action of rust and corrosion. This feature alone puts LUBRIPLATE far out in front of conventional lubricants.
LUBRIPLATE
Lubricants are extremely economical for reason that they possess very long life and "stay-put" properties. A little LUBRIPLATE goes a long way.
LUBRIPLATE
FISKE BROTHERS REFINING CO.
NEWARK 5, N. J. TOLEDO 3, OHIO
DEALERS FROM COAST TO COAST
CONSULT YOUR CLASSIFIED TELEPHONE BOOK

(Continued from page 274)

B. E. Hotvedt, of Blackhawk Manufacturing Co.; J. A. Proven, of Sterling Tool Products Co.; H. E. Torrell, of Syracuse Supply Co.; H. B. Begg, of Squier, Schilling & Skiff, Inc.; W. W. Kemphert, of Worthington Pump & Machinery Corp.; J. McCullough, of The Yale & Towne Manufacturing Co.; W. W. French, of Dodge Manufacturing Co.; R. Dickson, of W. D. Allen Manufacturing Co.; and R. C. Neal of the R. C. Neal Co.

It was also planned to hold regional meetings for similar clinics at the Copley-Plaza in Boston, January 14; the Peabody House in Memphis, February 10; the Hotel Cleveland in Cleveland, February 25; and at the Warick Hotel in Philadelphia, March 25.

The following new officers of the Central States Supply Association were elected: president J. H. Ruddell, vice-president, Central Rubber & Supply Co., Indianapolis, Ind; vice-president W. C. Tier, Sterling Products Co., Chicago, Ill.; Secretary, A. M. Steed, general manager, Barrett Hardware Co., Joliet, Ill.; treasurer, J. R. Pauley, president, Triplex Supply Co., Milwaukee, Wis.

CALENDAR OF EVENTS

Jan. 6-8. Institute of Scrap Iron & Steel, Inc. Convention; New York City.

Jan. 14-17. National Materials Handling Exposition. Public auditorium; Cleveland, Ohio.

Jan. 15-17. American Warehousemen's Assn. 56th annual national convention; Hotel Statler, Cleveland, Ohio.

Jan. 23-26. Low Pressure Div. of Society of the Plastics Industry. Conference and exhibit; Edgewater Beach Hotel, Chicago, Ill.

Jan. 27-31. American Institute of Electric Engineers. Winter convention; New York City.

Jan. 27-31. International Heating & Ventilating Exposition. Cleveland, Ohio.

Jan. 28-Feb. 2. Society of Plastics Engineers. Exhibition; Chicago, Ill.

March 17. American Institute of Mining & Metallurgical Engineers. World conference on mineral resources; New York City.

March 17-19. American Society of Lubrication Engineers. Annual meeting; Pittsburgh, Pa.

March 22. American Society for Metals. Western Metal Conference and Exposition; San Francisco, Calif.

Apr. 28-May 1. American Foundrymen's Assn. 51st annual convention; Book-Cadillac and Statler Hotels, Detroit, Mich.

(Continued on page 278)

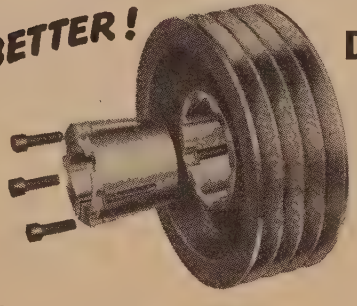
"Ah-ha—thought you'd sneak out with a few spare parts in your pocket, eh?"

NEW AND BETTER WAYS OF POWER TRANSMISSION

There are new ways to put more power on the job. Get the facts. Save time for your engineering and production executives. Ask the Dodge Transmissioneer to tell you about the latest developments by Dodge of Mishawaka. The Transmissioneer is your local Dodge distributor, listed in the classified telephone directory under "Power Transmission Equipment."

DODGE MANUFACTURING CORPORATION, MISHAWAKA, INDIANA

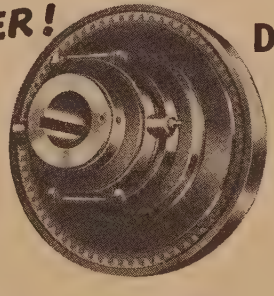
NEW AND BETTER!



DODGE TAPER-LOCK BRAND SHEAVE

An entirely new type of taper bushed sheave—the simplest, surest mechanism ever devised for holding wheels to shafts! No flange. No collar. No protruding parts. Mounts as a complete unit. Breaks all speed records in mounting and demounting—saves time and temper.

NEW AND BETTER!



DODGE ROLLING GRIP FRICTION CLUTCH

No Toggles! Rugged, compact, easy to adjust. Another great achievement of Dodge Transmissioneering . . . designed to give outstanding flexibility and ease of control without any sacrifice of positive drive . . . and available at low cost! Sizes ½ H. P. to 20 H. P. at 100 R.P.M.

NEW AND BETTER!

DODGE *BronZoil* BEARING

Designed especially for exacting requirements of fan and blower service. Capillary bronze bushing has capacity of one-third its volume in oil. Reservoir and wick provide ample lubrication. Fully self-aligning. Neoprene oil resisting grommets available for noise isolation.

DODGE
MISHAWAKA

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NAME PLATES

FOR YOUR NAME PLATE REQUIREMENTS, WRITE OUR SUBSIDIARY, ETCHING COMPANY OF AMERICA, 1520 MONTANA STREET, CHICAGO 14, ILLINOIS

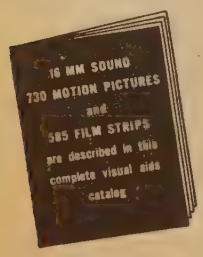
JUST OFF THE PRESS, this big new catalog describes the largest and most important group of visual aids for classroom and factory use yet produced. These low-cost training films are being widely used all over America in teaching thousands of workers and students in many fields.

They were produced by the U. S. Office of Education and other Government agencies with the complete cooperation of the foremost authorities in education and industry.

You, too, can make your teaching of difficult concepts and principles—your training of workers, easier and more effective by using these 16 mm sound motion pictures. Aid your students and trainees to *learn faster!*

A FEW EXAMPLES OF THE MANY SUBJECTS AVAILABLE

A New Supervisor Takes a Look at His Job
Safety in the Shop



Adding or Removing Refrigerant
The Airplane Mechanic
Techniques of Group Chest X-Ray Services
The Slide Rule
Veterans Report No. 1
Origin and Synthesis of Plastics Materials
Charging and Operating a Cupola
Trouble Shooting Your Car

NOTE: Supply of this 40-page Catalog is extremely limited . . . Write for your copy Today!

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DISTRIBUTORS FOR U. S. OFFICE OF EDUCATION

MF-1

Castle Films, Inc., 30 Rockefeller Plaza, New York 20, N.Y.

Please send me FREE COPY of the NEW 1947 CATALOG describing 730 Motion Pictures and 585 Film Strips.

Name

Street

City & State

(Continued from page 276)

Apr. 29-May 1. Industrial Packaging Engineers Assn., of America. Industrial Packaging & Materials Handling Exposition; Sherman Hotel, Chicago, Ill.

May 5-11. Society of the Plastics industry. National Plastics Exposition, Chicago, Ill.

● NAM's Annual Congress

A record-breaking attendance marked the fifty-first Congress of American Industry sponsored by the National Association of Manufacturers in December at the Waldorf-Astoria hotel, New York. International, and national authorities and key men in the NAM comprised the outstanding panel of speakers.

An industrial relations program to develop sound and friendly relations with employes, to minimize the number and extent of industrial disputes, and to assure more and better goods at lower prices to more people, was presented by the Industrial Relations Committee and approved. This program provided that employers should see that their policies encourage:

(Continued on page 280)

Prompt deliveries

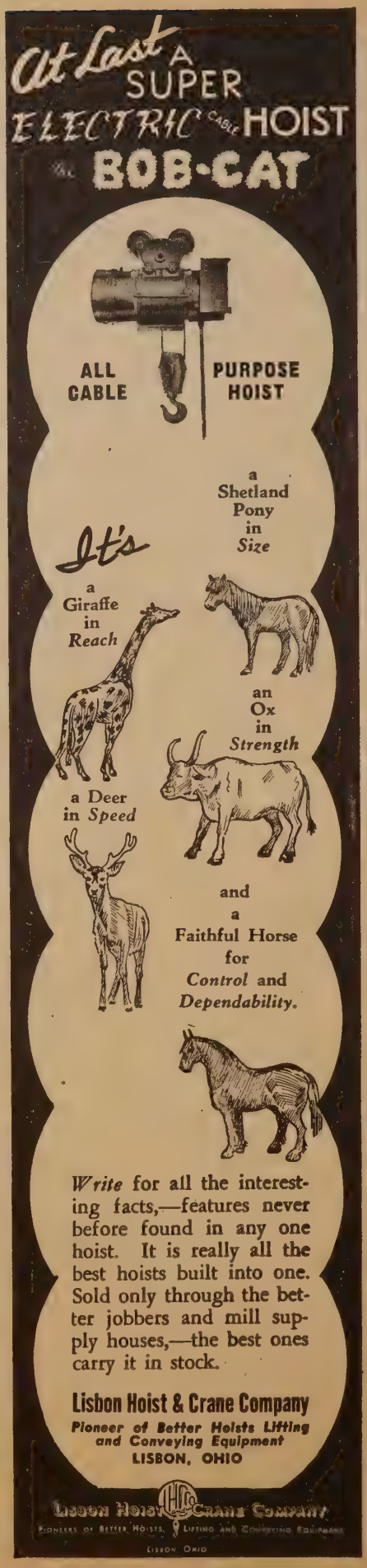
both types!

WIREGRIP Belt Hooks that can be applied with any make lacing machines, have double (patented) aligning cards that hold hooks in perfect alignment, prevent handling and card-end loss—every hook saleable and usable. Made in 6 sizes.

STEELGRIP Belt Lacing is applied with a hammer. Comes in 11 sizes, in standard boxes, handy packages or long lengths for wide conveyer belts. Have 2-piece hinged rocker pins.

Write for Catalog

ARMSTRONG-BRAY & CO.
"The Belt Lacing People"
5358 Northwest Highway, Chicago 30, U.S.A.


At Last A SUPER ELECTRIC CABLE HOIST
BOB-CAT
ALL CABLE PURPOSE HOIST
It's a Giraffe in Reach
a Shetland Pony in Size
an Ox in Strength
a Deer in Speed
and a Faithful Horse for Control and Dependability.
Write for all the interesting facts,—features never before found in any one hoist. It is really all the best hoists built into one. Sold only through the better jobbers and mill supply houses,—the best ones carry it in stock.
Lisbon Hoist & Crane Company
Pioneer of Better Hoists Lifting and Conveying Equipment
LISBON, OHIO
LISBON HOIST & CRANE COMPANY
PIONEERS OF BETTER HOISTS, LIFTING AND CONVEYING EQUIPMENT
LISBON OHIO

EFFICIENT SELF SERVICE

is a matter of Press Production

Modern merchandising owes much of its efficiency to a modern production method—*Press Production.* The Press is ideally suited to the production of panels for self-service refrigerators display counters, shelving—the many duplicated parts in the mechanism of a tabulating cash register.

In the press departments and Stamping Plants of America, Danly Die Sets and Die Makers' Supplies are recognized as a necessary part of good presswork, because Danly means *known dependable accuracy.*

DANLY MACHINE SPECIALTIES, INC.
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National Assembly

Call Danly

- **MILWAUKEE 2**
  111 East Wisconsin
- **DETROIT 16**
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  990 East Monument
- **ROCHESTER 4**
  16 Commercial Street
- **PHILADELPHIA 44**
  18 W. Chelten Avenue
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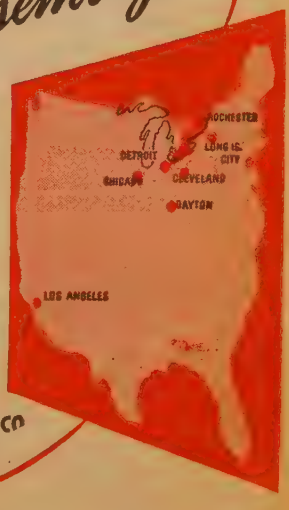
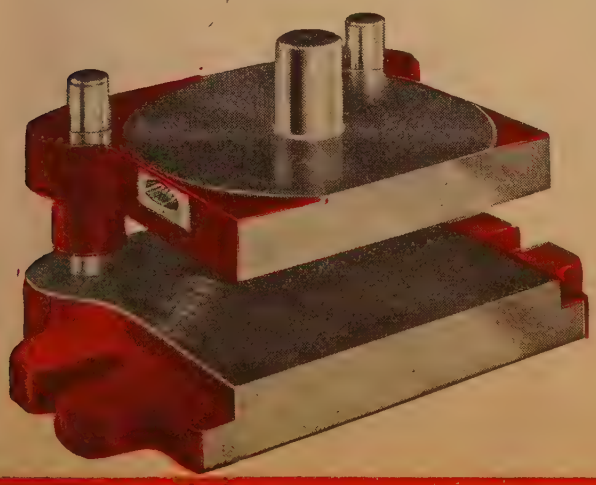
  47-28 37th Street
- **DUCOMMUN METALS & SUPPLY CO**
  4890 South Alameda, Los Angeles

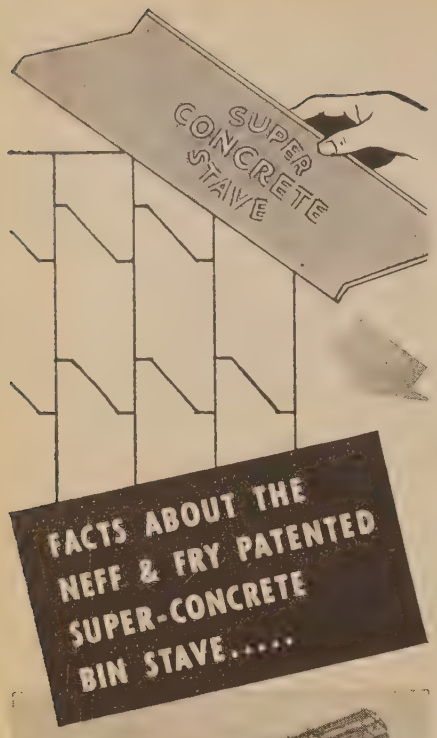




DIE MAKERS' SUPPLIES

DANLY DIE SETS

Welded Steel Fabrication



The Neff & Fry stave is formed under 140 tons pressure, 7090 lbs. to the square inch—making it the densest, strongest concrete stave obtainable. Special sand and gravel and highest grade cement used.

The unusual contour forces each stave to interlock with and support the six other staves that surround it, making each stave in the entire bin a veritable keystone of strength.

Each stave joint is covered and strengthened by a high tension steel hoop, binding the entire assembly of staves into a rigid, long-lasting whole.

Neff & Fry super-concrete stave bins have been on the market for years and are used in many industries for handling of bulky, flowable materials—coal, coke, sand, gravel, grain, kaolin, magnesium, etc.

Any capacity. Expert traveling erection crews. Rigid guarantee.

1947 Industrial Catalog Ready

THE NEFF & FRY CO.
CAMDEN, OHIO

SUPER-CONCRETE STAVE
BINS

(Continued from page 278)

1. "High wages based on high productivity, with incentives to encourage superior performance and output.

2. "Working conditions that safeguard the health, dignity and self-respect of the individual employe.

3. "Employment that is stabilized to as great a degree as possible, through direction of all the factors that are under management's control.

4. "A spirit of cooperation between employes and management through explanation to employes of the policies, problems and prospects of the company."

The report also stated that:

"The right of employes to join or not to join a union should be protected by law. In exercising the right to organize in unions or the right not to organize, employes should be protected by law against coercion from any source.

Principles set forth for both management and labor to observe are:

1. "The union as well as the employer should be obligated, by law, to bargain collectively in good faith, provided that a majority of the employes in the appropriate unit wish to be represented by the union.

(Continued on page 284)

Universal's

NEW DRILL PRESS TAPPING ATTACHMENT

FOR ALL STANDARD MAKE DRILL PRESSES

High Speed Tapping No. 8 to ½" in Brass. No. 8 to ⅜" in Cast Iron and No. 8 to 5/16" in Steel.

Write for full particulars today

UNIVERSAL ENGINEERING COMPANY
OF SAN DIEGO, CALIFORNIA

Universal also announces a new high speed Tapping attachment for their Drill Press Turret Head. Write for detailed information about this new, versatile tool that permits drilling and tapping in one operation at the same station.

HILLYARD
Hi-Quality
FLOOR
Treatments
AND
Maintenance
PRODUCTS

★ **DEPENDABLE**
★ **UNIFORM**
★ **ECONOMICAL**
★ **SAVE TIME**

AND PROPERLY PROTECT AND MAKE ATTRACTIVE ALL TYPES OF FLOORS AND GIVE ENTIRE SATISFACTION WITH LESS LABOR.

There is a Hillyard Floor Treatment Specialist in your locality, he will gladly give advice and recommendations on any maintenance problem, call or wire us today, no obligation.

Send for your FREE copy of this new book, full of real information. Write now.

THE HILLYARD COMPANY

DISTRIBUTORS

Hillyard Chemical Co., St. Joseph, Mo.
370 TURK ST., SAN FRANCISCO, CALIF.
1947 BROADWAY, NEW YORK, N. Y.

Whiting presents a new line of hoists . . . so light they can be installed by one man . . . yet so rugged they will stand up under the heaviest duty. The one-ton hoist weighs only 87 lbs. The new Whiting hoist has steel from hook to hook . . . requires only twenty inches of head room . . . has precision ball bearings throughout. Its compact worm-gear drive provides smooth, silent power . . . fewer parts to wear and fewer parts to adjust. Its single-bar grip provides easy one-hand control. Yet in spite of its many advantages, this new Whiting hoist costs little more than a hand hoist.

Write for Bulletin H-100 . . .

T I N G

WHITING CORPORATION, 15656 LATHROP AVENUE, HARVEY, ILLINOIS

EXCLUSIVE—

THERE'S ONLY ONE LEANING TOWER OF PISA . . . AND

ONLY ONE—

AW SUPER-DIAMOND

FLOOR PLATE

Often imitated, but never duplicated, AW Super-Diamond Pattern Floor Plate gives you three distinctive advantages that no ordinary floor plate can offer. It grips without a slip (prevents costly slipping accidents). It's easy to clean (water drains and dries rapidly). It's easy to match (prevents cutting waste). Insist on AW Super-Diamond Floor Plate for your every flooring need, and get the most for your money.

FREE Write for a copy of our New 16-Page Booklet L-31. It's packed full of helpful information. Alan Wood Steel Co., Conshohocken, Penna.

GRIP WITHOUT A SLIP! EASY TO CLEAN! EASY TO MATCH!

AW SUPER-DIAMOND

FLOOR PLATES THAT GRIP

A Product of ALAN WOOD STEEL COMPANY

Other Products: Billets • Plates • Sheets • Carbon & Alloy

(Continued from page 280)

2. "The union as well as the employer should be obligated, by law, to adhere to the terms of collective bargaining agreements. Collective bargaining agreements should provide that disputes arising over the meaning or interpretation of a provision should be settled by peaceful procedures.

3. "Monopolistic practices in restraint of grade are inherently contrary to the public interest, and should be prohibited to labor unions as well as to employers. It is just as contrary to the public interest for a union or unions representing the employes of two or more employers to take joint wage action or engage in other monopolistic practices as it is for two or more employers to take joint price action or engage in other monopolistic practices.

4. "If a legitimate difference of opinion over wages, hours or working conditions cannot be reconciled through collective bargaining or mediation, employes should be free to strike where such strike is not in violation of an existing agreement. However, the protection of law should be extended to strikers only when the majority of employes in the bargaining unit, by secret ballot under impartial supervision, have voted for a strike in preference to acceptance of the latest offer of the employer. Employes and employers should both be protected in their right to express their respective positions.

5. "No strike should have the protection of the law if it involves issues which do not relate to wages, hours or working conditions, or demands which the employer is powerless to grant. Such issues and demands are involved in jurisdictional strikes, sympathy strikes, strikes against the government, strikes to force employers to ignore or violate the law, strikes to force recognition of an uncertified union, strikes to enforce featherbedding or other work—restrictive demands, or secondary boycotts.

6. "No individual should be deprived of his right to work at an available job, nor should anybody be permitted to harm or injure the employe, or his family, or his property, at home, at work, or elsewhere. Mass picketing and any other form of coercion or intimidation should be prohibited.

7. "Employers should not be required to bargain collectively with foremen or other representatives of management.

8. "No employe or prospective

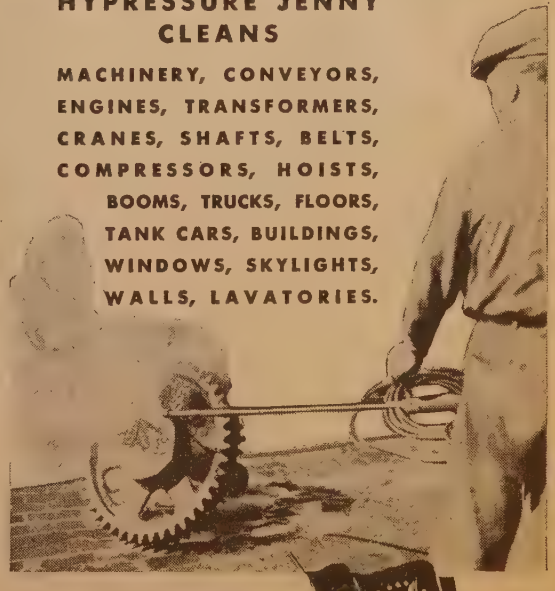
(Continued on page 286)

Actual time studies reveal that when mechanics are forced to fight dirt and grease on machinery, tools and equipment, their production speed is slowed as much as 25% to 40%. Periodic JENNY Steam-Spray cleaning not only saves these precious man-hours, but often prevents costly shutdowns by revealing cracks and defects in vital production machinery in time to permit repairs before serious failures occur. JENNY keeps floors and runways clean for safer, faster plant traffic . . . provides better light by cleaning windows, walls and skylights . . . lessens fire hazards. And JENNY does it 8 to 10 times faster than by outmoded hand-cleaning methods.

Hundreds of manufacturing plants, mills and factories have adopted JENNY as the quickest, most economical and most efficient method for all their cleaning jobs. Let us show you how to increase *your* plant production by getting rid of speed-retarding dirt and grease the JENNY Steam-Spray Way. Write today.

HYPRESSURE JENNY CLEANS

MACHINERY, CONVEYORS, ENGINES, TRANSFORMERS, CRANES, SHAFTS, BELTS, COMPRESSORS, HOISTS, BOOMS, TRUCKS, FLOORS, TANK CARS, BUILDINGS, WINDOWS, SKYLIGHTS, WALLS, LAVATORIES.



"M" Pennant with three additional gold stars—Maritime's highest production award to our men and women making valves for the Victory Fleet.

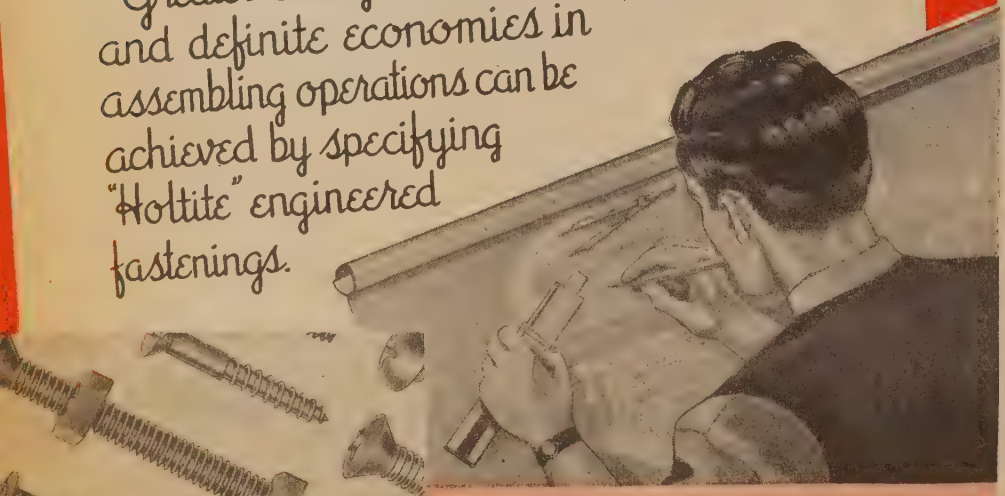
HYPRESSURE JENNY DIVISION OF

HOMESTEAD VALVE MFG. CO.

P. O. BOX 87 . . . . . CORAOPOLIS, PENNSYLVANIA

Fasten Tighter, Stronger at Less Cost!

More than ever before, production economies must be emphasized in the design of new products. In addition to reducing labor costs, product performance must be improved. Greater strength, more enduring service and definite economies in assembling operations can be achieved by specifying "Holtite" engineered fastenings.



Man hours in assembling operations can be saved at the drawing board! The right fastening for each application, specified in the design of your new products or when re-designing old products, will reduce production time and costs. Keep a copy of the Continental Screw Company illustrated catalog in your Engineering Dept. It contains comprehensive fastening data, full listing of all sizes, dimensions, weights, diagrams, recommendations and other helpful information.

Cut Fastening Time 50%

Time study records show 50% and more saving in fastening time when HOLTITE-Phillips recessed head screws are used. Precision recess and mated tapered bit permit safe power driving, even on finished parts. Replace old screw driving method with this modern, cost-cutting fastening practice. Specify HOLTITE-Phillips.

CONTINENTAL SCREW CO. New Bedford

(Continued from page 284)

employe should be required to join or to refrain from joining a union, or to maintain or withdraw his membership in a union, as a condition of employment. Compulsory union membership and interference with voluntary union membership both should be prohibited by law.

9. "Biased laws and biased administration of laws have made a contribution to current difficulties, and should be replaced with impartial administration of improved laws primarily designed to advance the interests of the whole public while still safeguarding the rights of all employes. The preservation of free collective bargaining demands that government intervention in labor disputes be reduced to an absolute minimum. The full extent of government participation in labor disputes should be to make available competent and impartial conciliators. Compulsory arbitration, in particular, is inconsistent with American ideals of individual freedom and is bound to destroy genuine collective bargaining."

New President

Elected as NAM president for 1947 is Earl Bunting, president of the O'Sullivan Rubber Corporation of Winchester, Va. He succeeds Robert R. Wason, president of Manning, Maxwell & Moore, Inc.

Prime Minister Jan Christian Smuts of the Union of South Africa spoke at the closing dinner meeting.

Ira Mosher, chairman of the NAM in 1946, as one of the convention speakers pointed out that "the road ahead is studded with obstacles, but so were the Normandy beaches on D-Day."

Referring to the association's plan for stabilized employment, Mr. Mosher said that "if we hope to provide the industrial leadership necessary to the rebirth of American ascendancy in the world of tomorrow, there must be no danger of being procrastinators, of carrying a chip on the shoulder, and of permitting union interference with the welfare of employes." He pointed out, also, the need to acquaint workers with plans of the company on projects which affect them.

"Is it any wonder that the voices from the left get the ears of our employes when we fail to give them the facts and figures about our business; when we fail to make them a part of the team; when we fail to give them the sense of security

(Continued on page 288)

CLAY PIPE *prevents corrosion* CAUSED BY TRADE WASTES

Clay Pipe is being used in the relocation and replacement of sewers made necessary by construction of a flood wall to protect Parkersburg, W. Va., from the Ohio and Kanawha Rivers.

Heavy loads are imposed on the pipe, because there is 15 feet of cover in some places, but the Clay Pipe specified more than meets this load requirement.

Industrial wastes containing hot muriatic and sulphuric acids from the Parkersburg Iron and Steel Co., will pass through this 30-inch corrosion-proof Clay Pipe. This $500,000 flood project is being handled by the U. S. War Department, with Col. B. B. Talley, Dist. Eng., and Lt. Col. Harry Pockras, Asst. Dist. Eng., in charge.

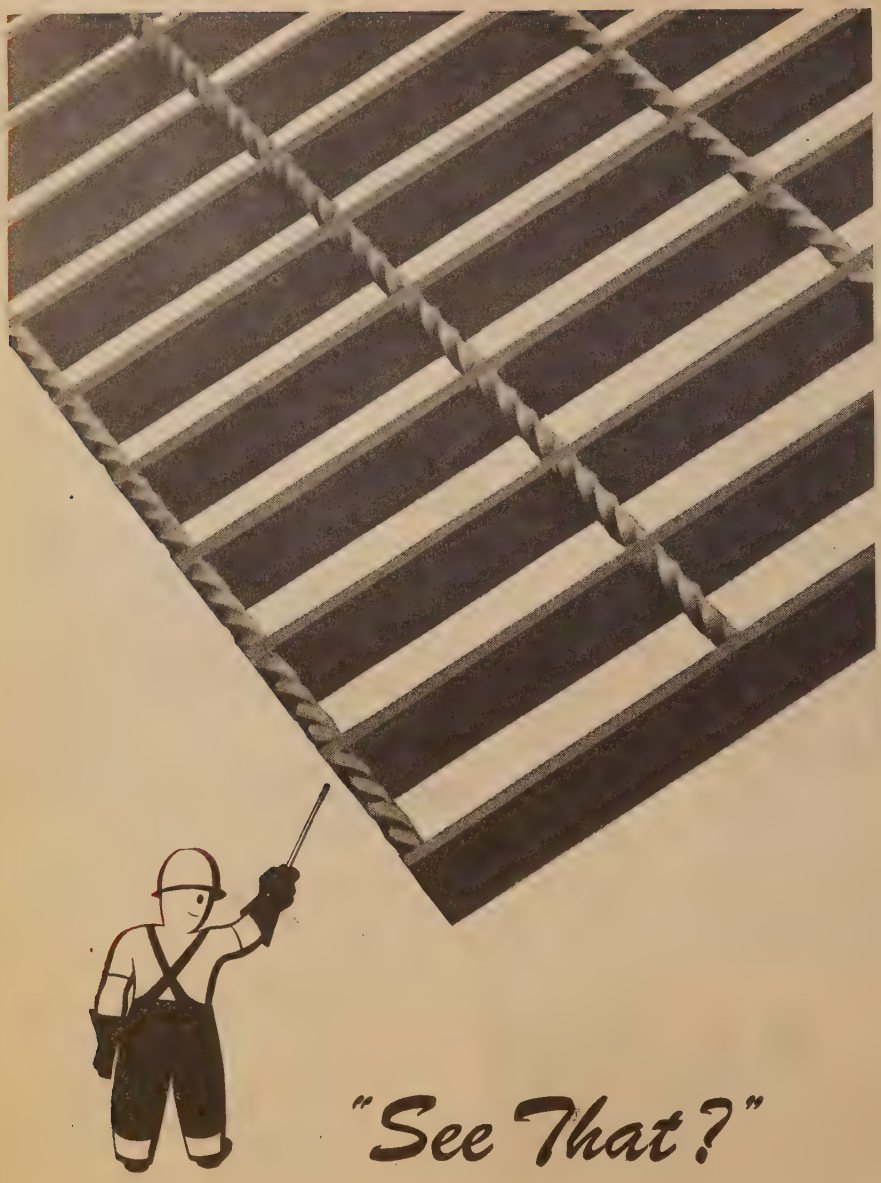
CLAY PIPE NEVER WEARS OUT!

Vitrified Clay Pipe is the only pipe engineers can be *sure* of to withstand the attack of any acid found in sewage and industrial wastes. Corrosion, rust, decomposition and abrasion are never problems with Clay Pipe installations. Made of nature's indestructible raw materials fused into the desired shape by vitrification . . . Clay Pipe has no equal in long, trouble-free performance records.

NATIONAL CLAY PIPE MANUFACTURERS, INC.
522 First National Bank Bldg., Atlanta 3, Ga.
1105 Huntington Bank Bldg., Columbus 15, Ohio
111 W. Washington St., Chicago 2, Ill.
571 Chamber of Commerce Bldg., Los Angeles 15, Calif.

CLAY PIPE

C-1146 B



"See That?"

That's the electroforged bond between the twisted cross bar and bearing bars which distinguishes Blaw-Knox Steel Grating — making it a rigid, one-piece "material" easy to install . . . Provides safe, sure footing at all times . . . admits maximum light and air.

BLAW-KNOX DIVISION of Blaw-Knox Company
2044 FARMERS BANK BUILDING
PITTSBURGH 22, PA.

BLAW-KNOX ELECTROFORGED STEEL GRATING

(Continued from page 286)

that they need to feel in the business?" he asked.

U. S. Senator Joseph H. Ball, Secretary of Commerce W. Averell Harriman, U. S. Senator Harry F. Byrd, and Alexandre Parodi, Ambassador of France, were among the many other speakers on the program.

Robert R. Wason, retiring president, asserted that only the ineptitude of America's labor government can prevent the technological expansion that now beckons the people to higher standards of living. "It is conservative to say that if governmental interferences do not choke us, we are on the threshold of the most glorious period of man's eternal struggle to improve his economic well-being," he said.

● Metal Congress Held

The equipment exhibition at the 28th annual Metal Congress and Exposition held in November at Atlantic City, N. J., occupied two levels of the Municipal Auditorium and covered approximately 400 individual exhibitors. Quality control and the increase of labor productivity by more efficient machines marked the general theme of the Congress which was sponsored by the American Society of Metals, the American Welding Society, the metal division of the American Institute of Mining and Metallurgical Engineers, and the American Industrial Radium and X-ray society. The show was attended by approximately 40,000 visitors.

New officers chosen for the American Society of Metals include: president, A. L. Boegehold, metallurgy department head, Research Laboratories Div., General Motors Corp., Detroit, Mich.; vice president, F. B. Foley, superintendent of research, Midvale Co., Philadelphia, Pa.; trustee, A. E. Focke, research metallurgist, Diamond Chain & Mfg. Co., Indianapolis, Ind.; trustee, J. E. Dorn, associate professor of physical metallurgy, University of California. Bill Eisenman was reelected secretary.

The American Welding Society elected L. W. Delhi, vice president of Hunt, Merck & Co., San Francisco, as new president. Other officers are: first vice president, Harold O. Hill, assistant chief engineer, fabricated steel construction, Bethlehem Steel Co., Bethlehem, Pa.; second vice president, George H. Sieger, president and general manager, S-M-S Corp., Detroit.

(Continued on page 290)

CARBIDE AT ITS BEST . . . . .

GET MAXIMUM CARBIDE EFFICIENCY

WITH SUPER EJECTOR-TYPE TOOL

Replaceable Carbide Bit is held without strain of any sort, permitting it to really go to work—with results never before obtained.

You get longer life . . . more work . . . much greater resistance to chipping, cracking, checking . . . no loss of efficiency after re-grinds . . . less than half the loss of Carbide when re-sharpening . . . lower grinding wheel costs, etc.

You are losing money every day you run without this tool.

Write for particulars, or call our local representative

Carbide Tipped Tools

For Turning • Facing • Reaming • Spotfacing • Forming
Wear Parts • Boring • Milling • Drilling • Counterboring
Shaving • Centers • Grinder Rests • Special Purposes

SUPER TOOL COMPANY

Carbide Tipped Tools

21650 Hoover Road, Detroit 13, Michigan

OUT OUR WAY

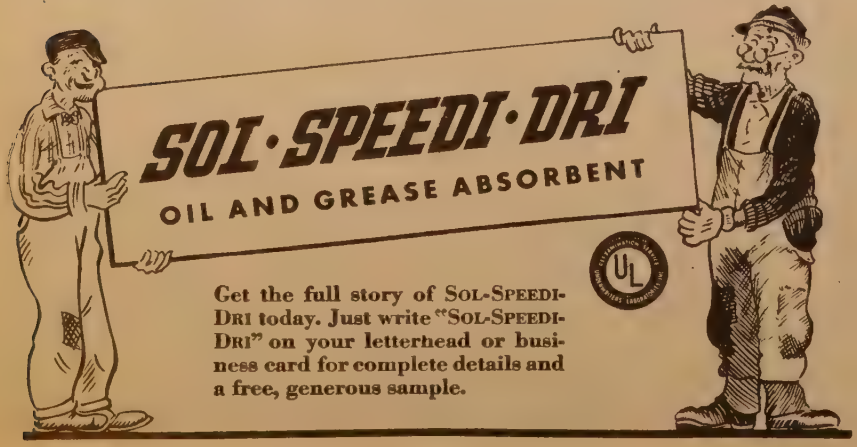
THAT'S TH' BIGGEST STRAIN OF BEIN' TH' HEAD OF ANYTHING! TH' ONES WHO CAN'T GET ALONG WITHOUT YOU ARE TOO QUICK WITH TH' PULMOTOR, AN' TH' ONES THAT CAN'T GET ALONG WITH YOU ARE TOO QUICK WITH TH' STRETCHER!
YEH--BUT IT WAS A TERRIBLE SHOCK! THEY JUST TOLD HIM THAT WE'RE OUTA SOL-SPEEDI-DRI AND THEY FERGOT TO ORDER SOME!
A CRYING SHAME
J.R.WILLIAMS
T. M. REG. U. S. PAT. OFF. COPR. 1946 BY NEA SERVICE, INC.

A crying matter? Sure . . . for when floors become oil- and grease-soaked . . . when their surfaces become ice-slick and dangerous . . . it's *time* to cry for SOL-SPEEDI-DRI, the oil-thirsty absorbent!

SOL-SPEEDI-DRI is a white, granular substance that soaks-up oil- and grease-deposits as a sponge soaks-up water. Just spread it around . . . and immediately, you've got a magic carpet of safety underfoot . . . no slipping or falling with SOL-SPEEDI-DRI on the job. Sweep it up with an ordinary, stiff broom . . . and your floors are bright and safe.

SOL-SPEEDI-DRI puts economy in any industrial plant on a firm foundation. Accident rates go down . . . productive time goes up . . . manpower is saved for other jobs. It works while you work . . . in safety!

SUPPLIERS: *East*—Safety & Maintenance Co., Inc., No. 1 Wall St., New York 5, N. Y.
South, Midwest & West Coast—Waverly Petroleum Products Co., Drexel Bldg., Philadelphia 6, Pa.


SOL·SPEEDI·DRI
OIL AND GREASE ABSORBENT
UL
Get the full story of SOL-SPEEDI-DRI today. Just write "SOL-SPEEDI-DRI" on your letterhead or business card for complete details and a free, generous sample.

(Continued from page 288)

Al F. Cota, of A. O. Smith Corp., Milwaukee, Wis., was elected president of the American Industrial Radium and X-ray Society. Vice president is Don M. McCutcheon, Ford Motor Co., Detroit, Mich.; treasurer, Dana W. Smith, Glenn L. Martin Co., Baltimore, Md. Kent R. Van Horn, retiring president, will serve as director for one year. In appreciation of his efforts and accomplishments during the five years he has served as a national secretary of the society, Philip D. Johnson was presented with a certificate and gift.

At the sessions of the American Welding Society, 79 technical papers were presented under the following classifications: research, resistance welding, machinery, shipbuilding, cutting, structural work, welding alloy steels, pressure welding, aircraft, hardfacing, high alloys, and miscellaneous. At the ASM 65 formal technical presentations and 31 educational lectures, subjects such as high temperature alloys, steelmaking, physical testing, heat treatment, temper brittleness, etc., were covered.

A joint symposium on "Effects of Multiaxial Stresses on Metals" was a feature of the sessions of the Iron and Steel Division and the Institute of Metal sections of the American Institute of Mining and Metallurgical Engineers. The effects of substituting boron for a proportion of the molybdenum content of cast and wrought nickel-chromium-molybdenum and manganese-molybdenum steels were discussed by M. C. Udy and P. C. Rosenthal, Battelle Memorial Institute. Metallurgical problems ranging from atomic structure and multiaxial stresses to vacuum arc melting of molybdenum, the effects of various alloys and sponge iron production were considered in reports given at sessions of these groups.

● Workers' Health Studies

A medical viewpoint approach in the field of human relations in industry was evident in a series of conferences conducted recently in Detroit, Mich. The conferences were under leadership of Dr. Raymond Hussey, dean of the School of Occupational Health at Wayne University, Detroit, and followed the program of various universities in conducting research programs which may prove helpful in the field of industrial human relations.

To realize maximum utilization of the labor force of the country

(Continued on page 292)

"The Handiest Tool in the Shop"

Rigid tubular steel mast with cross bracing resists bending under swinging action of load.

Two Speeds: Fast single cable operation for light loads. Slower double cable operation for heavy loads.

Eccentric axle automatically locks wheels when load is being lifted.

Self-locking worm lifting mechanism holds the load safely at any point without ratchet or pawl.

Large diameter, wide faced wheels assures easy one man operation.

Four point wheel suspension on a wide base is practical engineering.

Wide wheel spacing affords additional stability.

Wide sturdy base insures protection against tilting.

HERE'S WHY

A "Canton" CRANE can lift and transport loads with

GREATER SAFETY

HILL ACME TOOLS FOR INDUSTRY

Made in a full range of sizes up to 11 feet clear lift.
3 ton capacity. Bulletin IMF gives complete details.

THE HILL ACME COMPANY

"CANTON" DIVISION • 6400 Breakwater Ave. Cleveland 2, Ohio

ALLIGATOR SHEARS AND PORTABLE FLOOR CRANES • ALSO MANUFACTURERS OF "ACME" FORGING · THREADING · TAPPING MACHINES • "HILL" HYDRAULIC SURFACE GRINDERS • "CLEVELAND" KNIVES AND SHEAR BLADES

DUFF-NORTON JACKS

MOVE MACHINERY... When there's work to be done in your plant, count on Duff-Norton Jacks

...For General Purpose Use

DUFF-NORTON AUTOMATIC LOWERING JACKS

Designed for all general lifting and lowering, this series is available in capacities from 5 to 20 tons—with raises from 7½" to as high as 18". All models are equipped with handy foot-lift and convenient carrying and spotting handles. Sturdy, trouble-free, easy to clean and maintain.

Are you moving machinery the hard way?

When you put in a new machine tool or remove an old one, how do you get it on and off rollers? Do you tie up your crane? Do you take a chance on a hoist? Do you strain your plant muscle power?

Or, do you go the easy way with Duff-Norton Jacks?

Keep a supply of Duff-Norton Jacks on hand to help on such jobs as moving machinery. They're safe and quick and inexpensive.

Get the new Catalog 203 which gives full details on the types, sizes, and uses of Duff-Norton Jacks. Call your industrial distributor . . . or write direct to Duff-Norton.

THE DUFF-NORTON MANUFACTURING CO.

PITTSBURGH, PENNSYLVANIA

There Is a Distributor Near You

(Continued from page 290)

insofar as full employment and efficient production are concerned, industrial health is highly important, it was pointed out at the conference. Purpose of the meetings was to consider means of correlating and preserving methods and techniques developed for the Army and Navy during the war in the fields of human relations and preventive medicine. This means approaching industrial health through the social sciences, not only the engineering sciences which deal with lighting, ventilation, etc. It would entail a practical approach whereby "well" persons can be approached by the medical profession in an effort to examine and evaluate health of worker groups and individuals.

• Awards Given

The 1945-46 Samuel Wylie Miller Memorial Medal, the prizes of the Resistance Welder Manufacturers Association, the 1946 Lincoln Gold Medal, and the 1946 A. F. Davis Undergraduate Welding Awards, were presented at the annual banquet of the American Welding Society at its 27th annual meeting, Ambassador Hotel, Atlantic City, N. J., in November.

Award of the Samuel Wylie Miller Memorial Medal was made to James F. Lincoln, president of The Lincoln Electric Co., Cleveland, "whose belief in the value of electric arc welding has led him to most effective promotions of its use."

Julius Heuschkel, research engineer, Westinghouse Research Laboratories, East Pittsburgh, Pa., was awarded the $750 first prize in the 1946 Resistance Welder Manufacturer's Association prize contest. This award was made for Mr. Heuschkel's paper entitled, "Selecting Spot Welding Schedules for Low Carbon Steels."

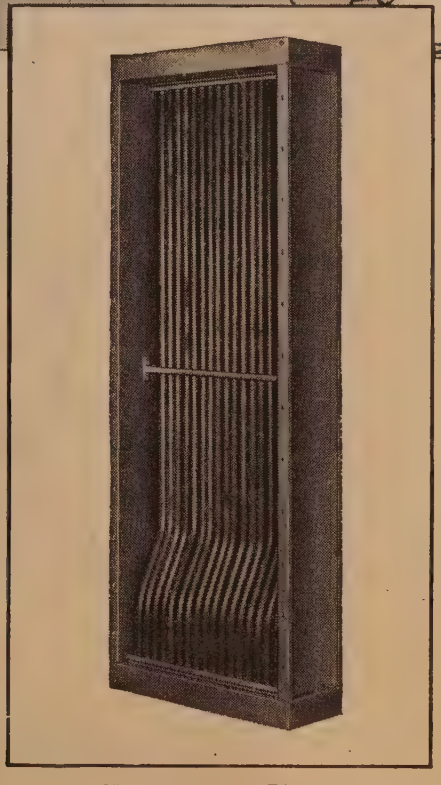
Joseph J. Riley, sales engineer, Taylor-Winfield Corp., received the second prize of $500 for his paper on "Vibration of Spot Welds in Low Carbon Steel Over a Range of Welding Variables."

The third award of $250 went to Robert W. Bennett and Robert D. Williams, authors of the paper entitled, "The Flash Welding of Hard Drawn High Carbon Steel Wire."

In the group of papers emanating from a university, Robert C. McMaster and Nicholas Begovich received an award of $300 for their paper, "Instrumentation of the Spot

(Continued on page 294)

Before you select ANY COIL



New American Blower Heating Coil

1 CHECK THE MAKER

When choosing the heating or cooling coil that will do the best job for your specific installation first consider the engineering background and reputation of the maker. You'll find in short order that American Blower is one of the oldest and largest designers and manufacturers of air handling, air conditioning, heating, cooling and cleaning equipment.

2 Then the next step . . . DO THIS

Send for these two new bulletins, prepared by American Blower engineers. They make the work of selecting the best in coils quicker and easier. We've been told these bulletins are the most convenient guides and references ever printed on the subjects of coil selection, sizing and installation. All material is authoritative and up-to-the-minute. Here's all the information you will need in concise, easy-to-understand form.

Call the nearest American Blower Branch Office for your copies today. Or write for Bulletins B-1218 and 1521.

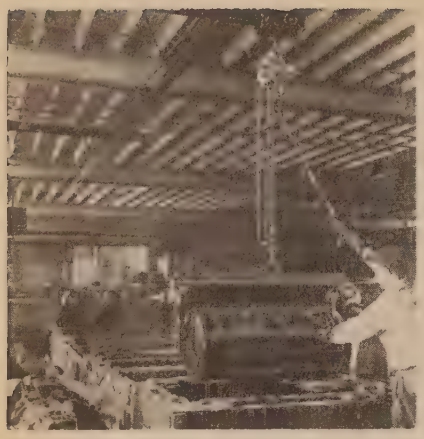
AMERICAN BLOWER

AMERICAN BLOWER CORP., DETROIT 32, MICH.

Division of American Radiator & Standard Sanitary corporation

In Canada: CANADIAN CIROCCO CO., LTD., Windsor, Ont.

MECH-DRAFT · AIR-CONDITIONING · AMERICAN BLOWER · FLUID DRIVES · DUST COLLECTORS



How to produce more!

Greater production at lower cost means more profit. With a 'Budgit' Electric Hoist to do the lifting, all the worker's energy is devoted to work.

With his mind entirely free from the danger of rupture and sprained back, his output increases and he is much more contented with his job.

Wherever lifting must be done and current is available, much time, money and energy can be saved with a 'Budgit' Hoist. This has been proved thousands of times in factories, warehouses, shops, farms, dairies — and in countless other places.

There are no installation costs! Each 'Budgit' Hoist is a complete lifting unit in itself — so, you simply hang it up, plug into the nearest electric socket and put it to work. The cost of operation is small — a few pennies a day.

If your lifting loads are 4000 lbs. or less, a 'Budgit' Hoist will pay for itself quickly, over and over again!

Made in sizes to lift 250, 500, 1000, 2000 and 4000 lbs. Prices start at $119. Write for Bulletins No. 371.

MAXWELL M&M MANNING & MOORE INC. TRADE MARK

'BUDGIT' *Hoists*

MANNING, MAXWELL & MOORE, INC.
MUSKEGON, MICHIGAN

Builders of 'Shaw-Box' Cranes, 'Budgit' and 'Load Lifter' Hoists and other lifting specialties. Makers of Ashcroft Gauges, Hancock Valves, Consolidated Safety and Relief Valves and 'American' industrial instruments.

(Continued from page 292)

Welder and Investigation of the Spot Welding of .091"—.091" 24ST A1 clad Sheet." Dr. W. F. Hess, W. D. Doty and W. H. Childs received the second award of $200 for their paper entitled, "The Spot Welding of NE 8715, NE 8630 and SAE 4340 in the 125-in. Thickness."

The Lincoln Gold Medal, presented annually by the American Welding Society since 1936, was awarded to H. E. Kennedy for his paper, "Some Causes of Brittle Failures in Welded Mild Steel Structures," which appeared in the November, 1945, issue of "The Welding Journal."

Recipients of the A. F. Davis Undergraduate Welding Awards were Stephen Mikochik and Joseph S. Ward, Jr., whose first-prize paper appeared in the "Manhattan Engineer," Manhattan College, New York City, and Lee Ragsdale, Jr., whose award paper appeared in the "Dukengineer," Duke University, Durham, N. C.

• Refrigeration Show

Results of the Fourth All-Industry Refrigeration and Air Conditioning Exposition in the Cleveland Public Auditorium Oct. 29 to Nov. 1, as tabulated by the Refrigeration Equipment Manufacturers Association, showed that in every respect the event exceeded any previous industry show by a wide margin.

The exposition was described by industry leaders as the first real, comprehensive gathering of representatives of every segment of the industry, from service engineers to contractors, from dealers to wholesalers, from individual manufacturers to complete associations, and from designing engineers and suppliers to users who depend on refrigeration, air conditioning and frozen foods for the operation of their businesses.

Attendance at the show tripled the attendance at the last all-industry show, held in 1941 before the war halted the industry's expositions. Floor area occupied by 208 exhibitors likewise was three times the 1941 space. In point of equipment shown, size of displays and value of exhibits, the 1946 event likewise far outshone all its predecessors.

Many new types and designs of equipment made initial appearances, while many manufacturers, hampered by material shortages, made preliminary announcements of new

(Continued on page 296)

The modern marker that marks as clearly and permanently as paint . . . any surface that takes paint . . . *with the ease of a pencil.*

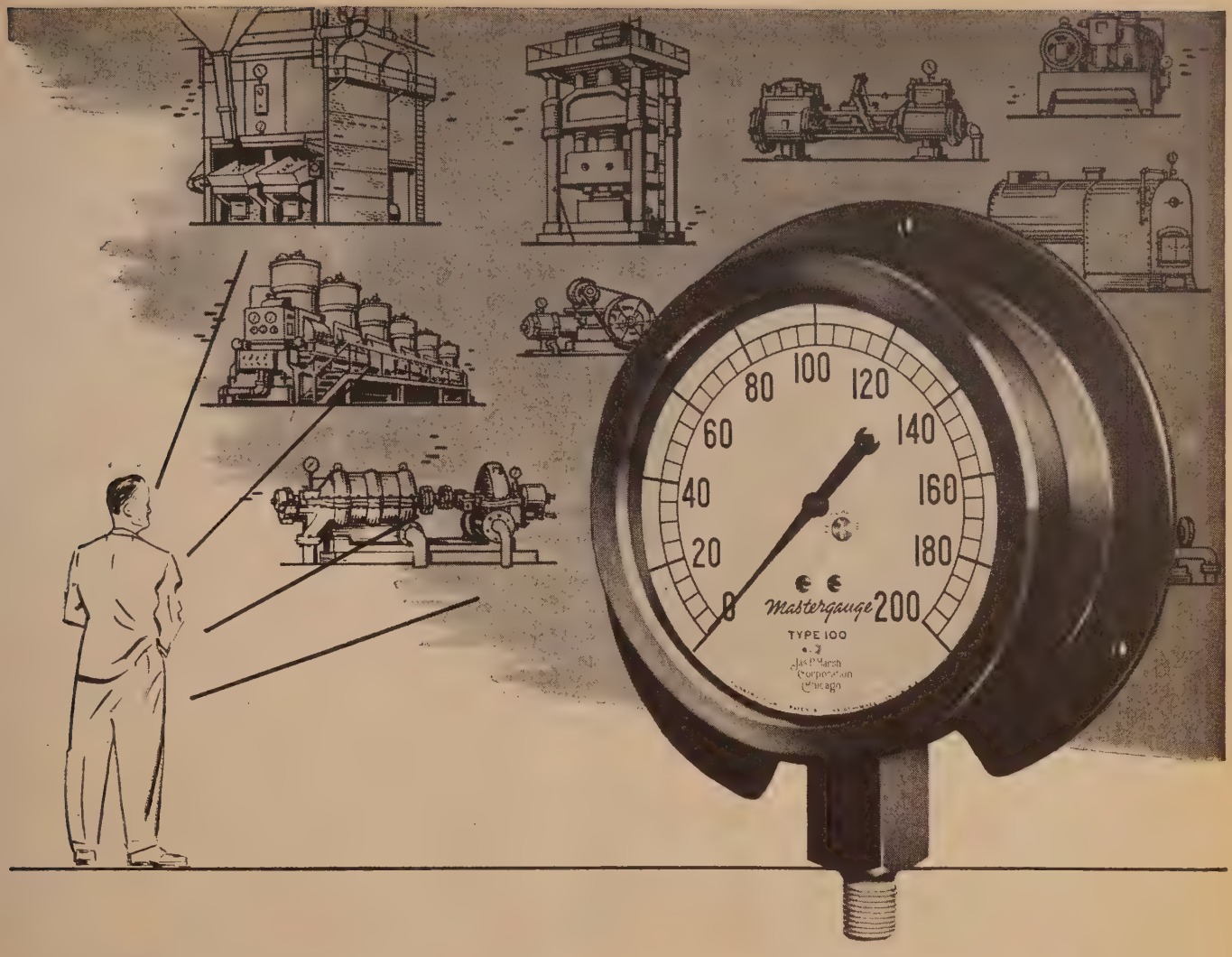
Paintmarx is always ready for use. No drying out—no running of color—no lumpy, dust collecting marks.

Discard the brush and paint bucket. Use this modern Stick o' Paint!

Send for FREE Industrial Crayon Guide

Dept. MF-31

THE AMERICAN CRAYON COMPANY
4706 HAYES AVENUE, SANDUSKY, OHIO
NEW YORK SAN FRANCISCO



Between you...and Trouble—

What's going on inside that boiler . . . tank . . . compressor . . . pump . . . forging press? It takes a pressure gauge to tell the story—and a good one to tell it right.

Keep that in mind when you select a gauge. Avoid the "just-stick-on-a-gauge" attitude. Remember that safety and performance depend on the accuracy — the "honesty"—of that gauge. Remember that your old friend, the pressure gauge, stands between you and trouble.

Those who *do* know the importance of accuracy insist on pressure gauges of Marsh quality. Excellent proof of this is the use of Marsh Gauges as original equipment by leading manufacturers of products requiring pressure indication.*

In the Marsh Masterguage, with its lathe turned bourdon tube and rugged, precision movement, they have found a pressure gauge that will maintain its accuracy year after year under the most arduous service industry knows—extreme pressure, heat, vibration, pulsation. And in all Marsh Gauges, down to the moderately priced Marsh "Standard" Gauges, they have found the same uncompromising quality that has made Marsh Gauges "The Standard of Accuracy."

When you select a pressure gauge—or when you select equipment requiring a gauge—insist on a Marsh. It will stand between you and trouble!

The gauge with the "Recalibrator"

Marsh alone has the "Recalibrator"—quickest and best way to correct a gauge that has been knocked out of adjustment by improper handling.

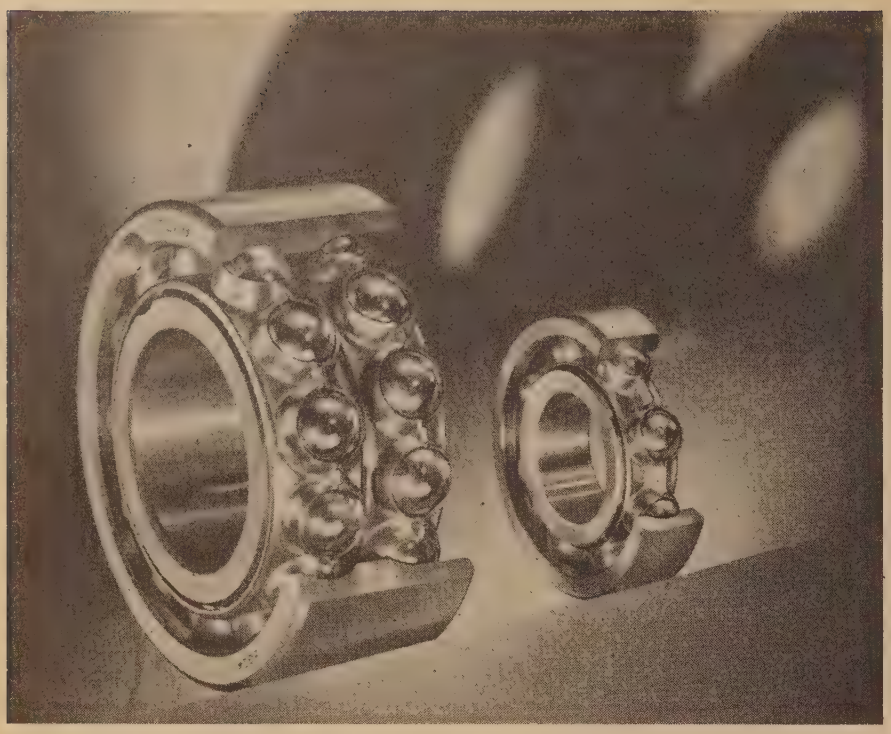
*Subsequent advertisements in this publication will cite typical examples of this.

Jas. P. Marsh Corporation, 2052 Southport Avenue, Chicago 14, Illinois

Jas. P. Marsh products include: A full line and range of gauges in pressure, compound, altitude, hydraulic, sprinkler, ammonia, ounce-graduated retard, test, and diagram types. Dial thermometers in rigid stem and remote reading types. *Ask for literature.*

MARSH GAUGES

"THE STANDARD OF ACCURACY"



That Significant and Comforting

SILENCE

The only message you ever get from CJB Ahlberg Bearings is SILENCE . . . a silence that tells eloquently of smooth efficiency, of "troubles that do not happen."

The name AHLBERG stands for a complete all inclusive service on bearings, ball and roller—

HEAVY DUTY • THRUST LOAD
RADIAL • SELF ALIGNING

For prompt, competent help on bearing problems, talk to an Ahlberg jobber.

AHLBERG BEARING COMPANY

3043 WEST 47TH STREET
CHICAGO 32, ILLINOIS

(Continued from page 294)

products soon to be introduced. Refrigerated vending machines which make change, self-feeding gravity freezers for stores, all-aluminum refrigerated trailers for frozen foods, ice cream makers for stores, new flake ice machines, new insulating materials, frozen food units for small apartments or country estates, frozen food packaging materials, new 700-lb. doors for cold storage warehouses, new water coolers and water cooling systems, and a wide variety of parts and accessories designed to provide more efficient operation for postwar equipment were among products displayed.

Success of the Fourth All-Industry Exposition has spurred plans for the next event to be held in January, 1948. Preliminary arrangements are being made by the Refrigeration Equipment Manufacturers Association at its Pittsburgh headquarters.

• Suggestion Conference

The national fall conference of the National Association of Suggestion Systems held at Hotel Drake, Chicago, Ill., in November was attended by 518 delegates representing 273 companies and government agents. The conference was addressed by Wayne A. Johnston, president of Illinois Central System; Lawrence A. Appley, personnel vice president and director of Montgomery Ward; W. A. Patterson, president of United Airlines; Frank R. Pierce, vice president of industrial relations, General Motors, and many other speakers.

New officers elected by the association for the year 1947 are: president, J. M. Jerpe, supervisor Suggestion Plan, General Motors Corp., Detroit, Mich.; vice president, F. A. Denz, administrator Suggestion Plan, Remington Rand, Inc., Buffalo, N. Y.; H. F. Foley, executive office assistant personnel, Peoples Gas Light & Coke Co., Chicago, Ill.; treasurer, C. A. Gueutal, secretary suggestion committee, Abbott Laboratories, North Chicago.

• Metal Trades Meeting

Included among speakers at the 47th annual convention of the National Metal Trades Association held in November at Hotel Commodore, New York, were H. J. Post, managing director of the National Association of Foremen; Senator Albert W. Hawkes, New Jersey; Henry W. Jones, Jr., president of the American Tube Bending

(Continued on page 298)

This RED BADGE of Merit

IS WELL-EARNED BY ALL PRODUCTS THAT WEAR IT

This "ribbon-etch" marks the products made by the longest-experienced manufacturer of cutting tools. And this mark means these 4 things:

1. It means that the product is made of special steel, usually from Simonds' own modern electric steel mills.

2. It means that the product is fabricated in the world's first windowless plant, where all working conditions are constantly controlled to keep workers' well-being and product-quality at top level.

3. It means that the product has been tested and re-tested to make sure you get full Simonds quality in every order. (There's no "second grade" in this line.)

4. It means that the product is represented, *to you,* by Simonds cutting-tool engineers... and by distributors and dealers . . . whose engineering judgment and sales counsel is as sound as the product itself.

And wherever this mark appears in *your* operations, *it will mark a deep cut in your cutting costs.*

SIMONDS CUTS YOUR CUTTING COSTS ON METAL, WOOD, PAPER, PLASTICS

SIMONDS
SAW AND STEEL CO.
FITCHBURG, MASS.
Other Divisions of SIMONDS SAW AND STEEL CO. making Quality Products for Industry
SIMONDS STEEL MILLS — Special Electric Furnace Steels
SIMONDS ABRASIVE CO. — Grinding Wheels and Grains
SIMONDS CANADA SAW CO. LTD. — Simonds Products for Canada

BRANCH OFFICES: 1350 Columbia Road, Boston 27, Mass.; 127 S. Green St., Chicago 7, Ill.; 416 W. Eighth St., Los Angeles 14, Calif.; 228 First St., San Francisco 5, Calif.; 311 S. W. First Ave., Portland 4, Ore.; 31 W. Trent Ave., Spokane 8, Washington. *Canadian Factory.* 595 St. Remi St., Montreal 30.

MERCER
"The Name that Carries Weight"
MATERIAL HANDLING EQUIPMENT

Industrial Type
TRAILER TRUCKS
with
PNEUMATIC TIRES

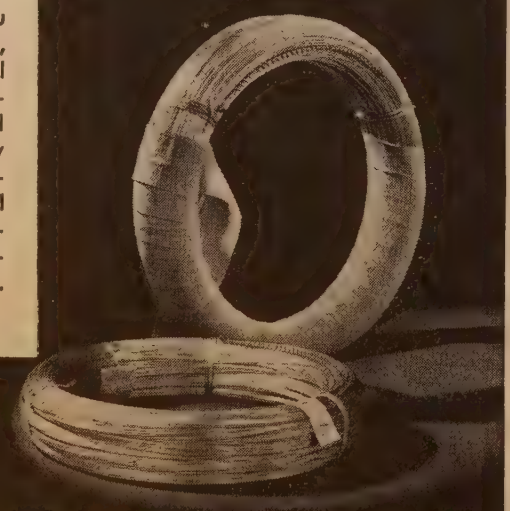
Trailer Trucks. Rubber Tired (Pneumatic, Solid) and Steel Wheels. Also Caster types. Designed by engineers whose reputation is founded upon doing things right. Literature available. Inquiries invited.

Type shown M-2205. Fifth wheel steer. Pneumatic-tired wheels. Roller bearing mounted. Hardwood deck. Edges reinforced.

MERCER ENGINEERING WORKS, INC.
Plant: Clifton, N. J.
SALES REPRESENTATIVE
MERCER-ROBINSON COMPANY, INC.
30 CHURCH ST., NEW YORK 7, N. Y.

The Wire of a Thousand Uses

XLO MUSIC WIRE now available with special alloy coating which gives you maximum tensile strength, absolute uniformity of all physical properties. Resistant to corrosive fumes and rust, Johnson special alloy coating has definite lubricating qualities, reducing tool wear, perfect base for soldering or plating. Withstands 700° Fahrenheit. Sizes .003 to .080



JOHNSON
STEEL AND WIRE COMPANY, INC.
WORCESTER 1, MASS.
NEW YORK AKRON DETROIT CHICAGO LOS ANGELES TORONTO

(Continued from page 296)

Co., New Haven, Conn.; Dr. F. Alexander Magoun, associate professor of human relations at Massachusetts Institute of Technology; Samuel B. Pettengill, former representative from Indiana; and Colonel John N. Andrews, special assistant to Veterans Administrator General Omar N. Bradley.

Management must be free to manage and "must not permit any encroachment upon its necessary functions and responsibilities," Mr. Jones declared before the several hundred industrial leaders from the east and middle west who attended the convention. Unless employers exercise their right of free speech within constitutional guarantee and take a "firm stand in preserving their necessary functions and responsibilities," these rights will wither away and die, he said.

Mr. Post, of the National Association of Foremen declared in his speech that the foreman does not want to be a bargaining unit but desires to be "an integral part of management where he rightfully belongs." He called upon top management to make certain that their foremen feel they are part of the management family stating that such a move would arrest any foremen's movement away from management into their own bargaining unit.

Four things which "erring or lethargic companies" sometimes do in their foremen's relationships, he said, are: bypass foremen in the grievance procedure; fail to give foremen needed information on contract, schedules, policies, etc.; not permit foremen to make decisions; fail to back up foremen or take them into their confidence.

The fall election results merely gave the United States a "suspended sentence—a reprieve—from state socialism," Samuel B. Pettengill declared at the association's annual dinner meeting. "The time before the assault of the forces championing socialism begins again should be devoted to a year-round campaign of education on the basic economics of the competitive system," he said. He deplored the fact that "51% of our people do not know what a balanced budget is; that only 30% understand what free enterprise means; that only one voter in four knows what the Bill of Rights is; that millions believe in some magical way by which government can create wealth; that a huge debt is of no importance because we owe it to ourselves; that

(Continued on page 300)

AJAX LO-VEYORS

The Ajax Lo-Veyor is a vibrating type of conveyor consisting of an open or enclosed pan or tube, a V-shaped trough, a screen or other type carrier driven by a reciprocating drive.

The pan or tube can be made of various materials and in various lengths to fit the type of aggregate and the distance which it is to be carried.

Drive mechanism is the Ajax-Shaler Shaker, a self-contained, enclosed, motor driven drive unit consisting of 2 revolving weights in automatic balance.

The conveyor pan and drive float on rubber mounted springs. The entire conveyor is simple to install... requires little head room (averaging less than 18")... can be set on the floor, in a pit, on wall brackets or suspended from ceiling.

10 years engineering and field experience in a wide range of industries will aid you in reducing material handling costs.

HOW AJAX LO-VEYOR SPEEDS UP CAR-TO-TRUCK GRAVEL HANDLING . . .

● The above drawing shows an Ajax Lo-Veyor installation in an eastern state handling sand and gravel direct from hopper cars to motor trucks. The Lo-Veyor is suspended from an overhead trestle and provides quick loading of trucks at the rate of 80 tons per hour.

Convenient control of the conveyor makes it possible to govern the flow into trucks.

This is typical of the versatility of Ajax Lo-Veyors in a wide range of applications.

AJAX FLEXIBLE COUPLING CO. INC.

AJAX

Put your conveying problems up to Ajax.

CONVEYOR AND SCREEN DIVISION

WESTFIELD, N.Y.

MORE WORK from LESS LABOR

...Moving Materials on

Faultless

ENGINEERED CASTERS

1. King Pin 1⅛" dia. for super-strength. 2. Thrust load taken off King Pin by recessing ball race of cone into top plate. 3. Double Ball Bearing swivel construction. Hardened bearings—large diameter hardened raceways. 4. Castellated nut for fine adjustment. 5. Reinforced ribs for extra strength. 6. Heavy roller bearing axle. 7. Husky wide-tread wheels. 8. Handy grease connection. 9. Uniform overall height. 10. Data for re-ordering.

Higher production costs demand *new short cuts*... less handling time... from receiving to shipping platforms. Right through the plant—without costly alterations—Faultless Casters speed up the *flow of materials* on a fluid, flexible production line. These sturdy expeditors save time and money—handle loads up to 9 tons—release manpower for more productive jobs. Faultless Casters are precision built with specialized machine-tools developed during half a century of caster-making experience—safeguarded with surplus strength at points of stress and wear. Let us give you further facts about *"Industry's finest Casters for Industry's toughest jobs."*

visit FAULTLESS CASTER exhibit
SPACE 28
Main Arena, Public Auditorium
Cleveland, Jan. 14-17, 1947

FAULTLESS CASTER CORP., Dept. 147, Evansville 7, Ind.
Branches in Boston, New York, Chicago, High Point, St. Louis, Detroit, Los Angeles. In other cities, consult your classified phone directory. Canadian Factory: Stratford, Ont.

(Continued from page 298)

government can guarantee security, and that 72% believe as much or more is disbursed to capital as is paid out in pay envelopes."

Colonel Andrews, in speaking about veterans, pointed out that women veterans of World War II "generally feel they are forgotten." "If the general public, educators, employers and business firms and others knew the part women played in the war, it is believed that the women veterans would have greater employment and educational opportunities and would no longer feel they are discriminated against," he said.

An Important "Know-How"

A "know-how" which is just as important as the "know-how" needed for finance, manufacturing or merchandising, is that of management's handling of emotions in its man-to-man relationships with its employes, Dr. Magoun told the delegates. "Some top executives have lacked an understanding of the forces they have been dealing with," he said and should "stop treating labor as though it were a raw material." Workmen do not want to manage but want management to listen, to understand their problems, and to think and to say "we," he declared. "An employe is a person just as much as an executive is—sometimes a much better person," he said.

"Understanding human relations cannot be done by passing laws or establishing steps to a grievance procedure," he said. "It can only be done by arduous, personal study on the part of top management, the results of which gradually infiltrate the entire organization."

Also in the roster of speakers for the convention were William B. Turner, president of Walker-Turner Co., Plainfield, N. J., whose subject was "Management's Functions"; James M. White, vice president in charge of production for Allis-Chalmers Co., who spoke on "The Allis-Chalmers Strike"; Joseph L. Kopf, president of Jabez Burns & Sons, Inc., whose subject was "Misconceptions"; Clarence B. Randall, a vice president of the Inland Steel Co., whose talk was entitled, "Management at the Crossroads"; William R. Schneider, St. Louis attorney, who spoke on "Fundamentals of National Ills and Remedies;" and John C. Gall, who has been counsel in cases such as the Little Steel case, and the portal-to-portal litigation involving the

(Continued on page 302)

HELIX in sand!

215 pound, one piece core (above) forms the business end of the 183 pound Cable Hoist Drum (right).

DIFFICULT PROBLEMS ...solved by UNITCAST know-how!

Solving tough problems at Unitcast often begins in the core room and pattern shop. Here—special equipment is built to form molds that will produce castings *accurately* and *uniformly* to specifications.

As an example, the helical contour of a core for this Cable Hoist Drum required intricate pattern equipment to assure a perfect helix in the core sand. To form a perfect core, Unitcast know-how concluded that hand ramming, layer upon layer, would force sand into each thread of the spiral and prevent soft spots in the core. Thus—due to Unitcast high standards—a true helix was produced in cast steel and expensive machine costs were eliminated.

The combination of Unitcast know-how and modern methods of production can help you build a better product and cut costs! Consult with Unitcast Engineers concerning your next steel casting requirements. Unitcast Corporation, Toledo 9, Ohio.

CHECK CHART

Send us this information with blueprints to get Unitcastings "geared to the job".

1. The end use of the casting.
2. Will it be welded to component part or frame?
3. Physical properties.
4. Subsequent heat-treating.
5. Mechanical tolerances.
6. Processing of casting in your shop before assembly.
7. Estimated quantity at one time and total quantity.

UNITCAST CORPORATION

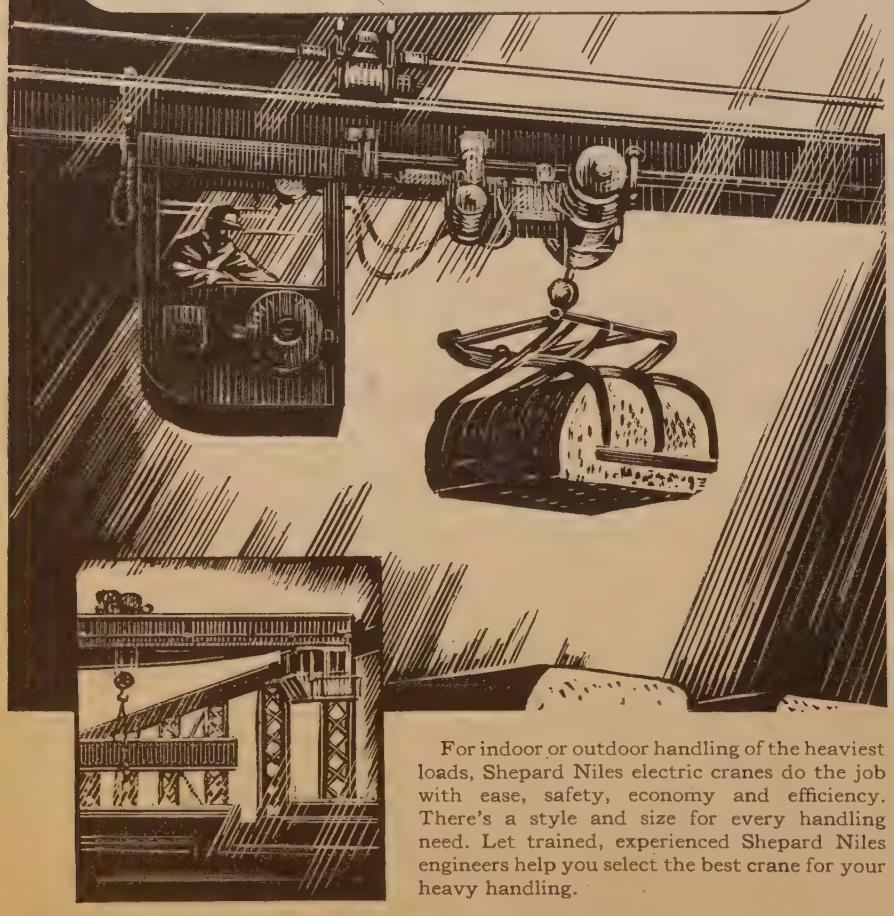
ALLOY AND CARBON ELECTRIC STEEL CASTINGS

Need A Railroad In Your Plant?

When you install a Shepard Niles monorail hoist you have your own private railroad to lift heavy loads, move them to other parts of the plant and deposit them where needed.

America's oldest builder of electric hoists and cranes has a style and size of monorail hoist for every handling operation from ⅛ to 20 tons. Trained, experienced Shepard Niles engineers will gladly survey your material handling problems and recommend, without obligation, the best style of monorail hoist to do the job. With over 5,000 styles and sizes from which to choose, there's bound to be one to suit you.

Shepard Niles monorail hoists, whether floor or cab operated, work economically and efficiently, year after year. When a Shepard Niles does the work there's no tired muscles, no absenteeism.



For indoor or outdoor handling of the heaviest loads, Shepard Niles electric cranes do the job with ease, safety, economy and efficiency. There's a style and size for every handling need. Let trained, experienced Shepard Niles engineers help you select the best crane for your heavy handling.

Shepard Niles
CRANE & HOIST CORPORATION
384 SCHUYLER AVE., MONTOUR FALLS, N. Y.

(Continued from page 300)

coal miners. His subject was "Government Seizure and Collective Bargaining."

"Unionization of Foremen" was the subject of a talk by Robert M. Ney, manager of industrial relations for the Baldwin Locomotive Works. David Clarke, general counsel for the National Metal Trades Association, spoke on "Travel Time Pay."

STRIKES
Nov. 1 to Dec. 1

UAW - CIO — Allis - Chalmers Mfg. Co. plants at West Allis & Racine, Wis., and Rockford, Ill. Wage demands, union shop, and control of grievance procedure.

UMW—United States Government as operators of Coal Mines. Reopening of wage provision of the Lewis-Krug agreement.

Association of Communications Equipment Workers — Western Electric Co., Detroit, Mich. Wage issue; 1100 strikers.

Air Line Pilots' Assn., AFL—Trans World Airline. Pay demands; 1400 strikers.

Newspaper Guild, CIO — The Philadelphia Record, Philadelphia, Pa., and The Camden Courier-Post, Camden, N. J. Wage and other demands in new contract.

Teachers at Uniontown, Pa.—Wage demands.

Drug Trade Salesmen's Union, CIO—Schieffelin & Co., New York. Union charged company of refusing to submit contract dispute to arbitration; 26 strikers.

Masters & Mates and Pilots, AFL—Pacific American Shipowners Assn., also Longshoremen's Warehousemen's Union and Marine Engineers Beneficial Assn., both CIO—Same shipowners.

Teachers in Warren County's 37 schools, Tenn.—Wage demands.

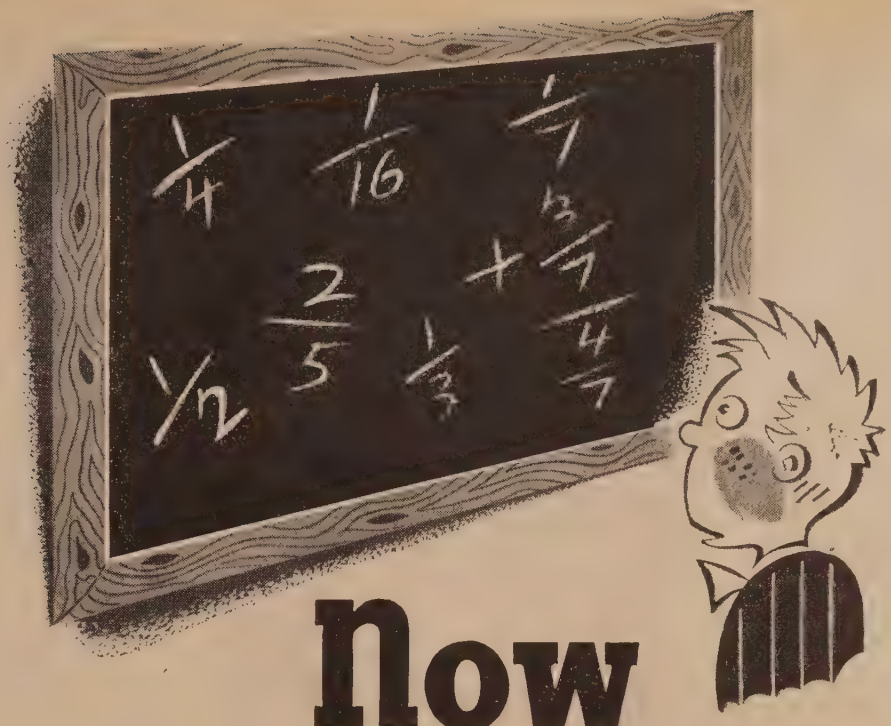
Teamsters Union, AFL — Five wholesale butter and egg companies, Newark, N. J. Protest against action of union executive board in suspending member for uncomplimentary remarks about local's executive board; 150 strikers.

Conference of Studio Unions—Hollywood, Calif. Motion Picture Studios.

Aircraft Workers Union — —Eclipse-Pioneer Div., Bendix Aviation Corp., Teterboro, N. J. Wage demands.

American Federation of Teachers, AFL—Schools in St. Paul,

(Continued on page 304)



Now

YOU CAN WORK OUT YOUR PLANT PROBLEMS IN FRACTIONS

Don't let the mere *size* of your plant needs keep you from going ahead with plans for starting a new business, or for improving or expanding your present production.

The Government offers you the opportunity to purchase or lease the facilities you may require . . . to move immediately into the business home you want—whether it be an entire plant or a mere fraction of the space.

Perhaps you may want to *expand* your production, or *modernize* your facilities, or *add* a new process, or *relocate* your business, or start a *new* enterprise. Whatever your plans, make your needs for plant and equipment known to the War Assets Administration office nearest you.

You have wide flexibility of choice from the hundreds of Government-owned surplus plants now being offered—for example: (1) Entire plants (both large and small—with or without equipment); (2) Separate buildings, where the facility is economically or operationally divisible; and (3) Leases of a *portion* of a single building under a multiple-tenancy arrangement.

Further, if you can qualify as a "small business", there is a possibility for you to purchase the plant you want under *high priority* through the Reconstruction Finance Corporation—a preference which our field offices will advise you how to obtain.

Get in touch with the nearest War Assets Administration office—see list below.

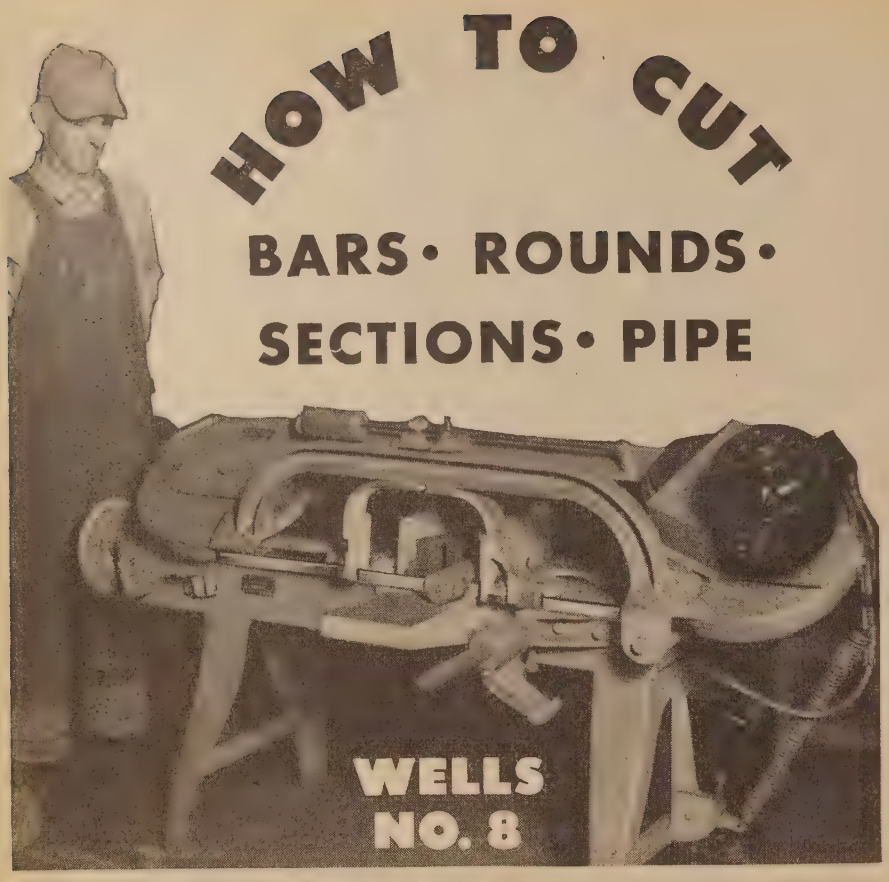
Write, phone or call for the PLANT-FINDER, a fully indexed, descriptive catalog of Government-owned plants.

WAR ASSETS ADMINISTRATION

OFFICE OF REAL PROPERTY DISPOSAL

Offices located at: ATLANTA • BIRMINGHAM • BOSTON • CHARLOTTE • CHICAGO • CINCINNATI • CLEVELAND • DALLAS
DENVER • DETROIT • FORT DOUGLAS, UTAH • HELENA • HOUSTON • JACKSONVILLE • KANSAS CITY, MO. • LITTLE ROCK
LOS ANGELES • LOUISVILLE • MINNEAPOLIS • NASHVILLE • NEW ORLEANS • NEW YORK • OMAHA • PHILADELPHIA
PORTLAND, ORE. • RICHMOND • ST. LOUIS • SAN ANTONIO • SAN FRANCISCO • SEATTLE • SPOKANE • TULSA

181-4



METAL CUTTING BAND SAW

• If you have a variety of metal cutting jobs—bars, rounds, sections, pipe, tubes—it will pay you to investigate the advantages offered by portable, practical Wells saws. Simple in design and rugged in construction, the Wells No. 8 requires no highly skilled operator or special handling. Powerful, quick-acting vise reduces set-up time to a minimum. Gravity feed and automatic shut-off make it practical for one man to operate two or more Wells saws simultaneously. For production work, your Wells can be equipped with the new Wells Wet Cutting System for faster cutting and longer blade life. Ask for the complete story. Literature and quotations on request.

specifications

CAPACITY:
Rectangular . . . . . 8"x 16"
(Special Guides) . . . . . 5"x 24"
ROUNDS: . . . . . 8" diameter
MOTOR: . . . . . ½ H. P., A. C. or D. C.
SPEEDS:
Selective 60, 90, 130 feet per minute
WEIGHT: . . . . . Approximately 665 lbs.

Wells SAWS
Wells

Products by Wells are Practical

METAL CUTTING BAND SAWS

WELLS MANUFACTURING CORPORATION
909 TAFT STREET, THREE RIVERS, MICH

(Continued from page 302)

Minn. Demands for wage increases and increase in school budget to cover maintenance, new equipment and new construction.

Teachers of Valley Rural district, near Fort Dodge, Iowa. Wage demands.

Newspaper Guild, CIO—Los Angeles Herald-Express, Los Angeles, Calif. Wage demands and other contract issues.

Newspaper Guild, CIO—Wichita Eagle, Wichita, Kan. Collapse of contract negotiations.

United Construction Workers, AFL Besser Manufacturing Co., Alpena, Mich. Closed shop and wage demands.

UAW, CIO—Lincoln plant of Ford Motor Co., Detroit, Mich. Wildcat strike of 360 trimmers in protest over firing of 3 employes.

Among other companies involved in strikes in November: Commonwealth Industries, Long Mfg. Div., Borg-Warner, Nilson Tool & Mfg. Co., Cummings Potical Co., Schulte Optical Co., Hydraulic Hi-Speed Co., Standard Brands, Inc., drivers, Long Industries, United Shirt Distributors, Fall Spring & Wire Co.

• Domestic Truck Bookings

Domestic bookings for electric industrial trucks and tractors during the month of October, 1946, totalled 267 units, figures just released by the Electric Industrial Truck Association, 208 South LaSalle Street, Chicago, Ill., indicate.

The net value of chassis only booked during October totalled $1,219,469.42 compared with $920,367.80 in September, 1946.

The October bookings included two platform trucks with capacities of 1000# to 6000#, and chassis base prices ranging from $1325 to $2445 had a total net value of $3,770; 228 cantilever trucks, with capacities and chassis base prices ranging from 1000# to 30,000# and $1,500 to $20,065, respectively, had a total net value of $1,035,369.05. Eleven light and heavy duty tractors with chassis base prices ranging from $1414 to $1875 had a total net value of $18,635.25; thirteen crane trucks with capacities and chassis base prices ranging from 3000# to 10,000# and $5480 to $9500, respectively, had a total net value of $96,170.12; thirteen special trucks with capacities and chassis base prices ranging from 2000# to 6000# and $3500 to $5500 had a total net value of $65,525, respectively.

(Continued on page 306)

Lighting Panels that make your eyes light up

BullDog lighting panelboards combine efficiency with visual appeal to make your eyes light up in appreciation of smart styling and progressive engineering.

BULLDOG SUPERBA PANELBOARDS

BullDog's SUPERBA Panelboards meet the combined need for beauty and utility in offices, stores and commercial buildings.

Standard SUPERBA features interlocked fuse doors to provide an added safety factor, since fuses are always "dead" when accessible.

Modified SUPERBA incorporates all advantages of the Standard Model, except that it is intended for installations where *electricians* will replace fuses and, for that reason, does not require interlocked fuse doors.

Both offer the exclusive OMNI-bus feature, permitting balancing of loads without removing the cabinet door or trim, or disturbing wiring connections. Heavy-duty toggle switches, with quick-make and quick-break action, minimize arcing and burning to insure longer life and lower maintenance costs. Cartridge fuse ejectors are integral in the design.

Cutaway view of Standard SUPERBA phenolic unit featuring OMNI-Bus bars, rugged toggle switches, cartridge fuse ejectors—all adding to the appearance and utility of this lighting panel line.

BULLDOG ROCKER TYPE PANELBOARDS

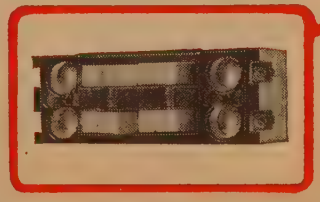
With BullDog ROCKER-TYPE Panelboards, ruggedness comes first.

These panelboards are designed particularly for factory use, where appearance is secondary but where circuits are apt to remain under load "around the clock."

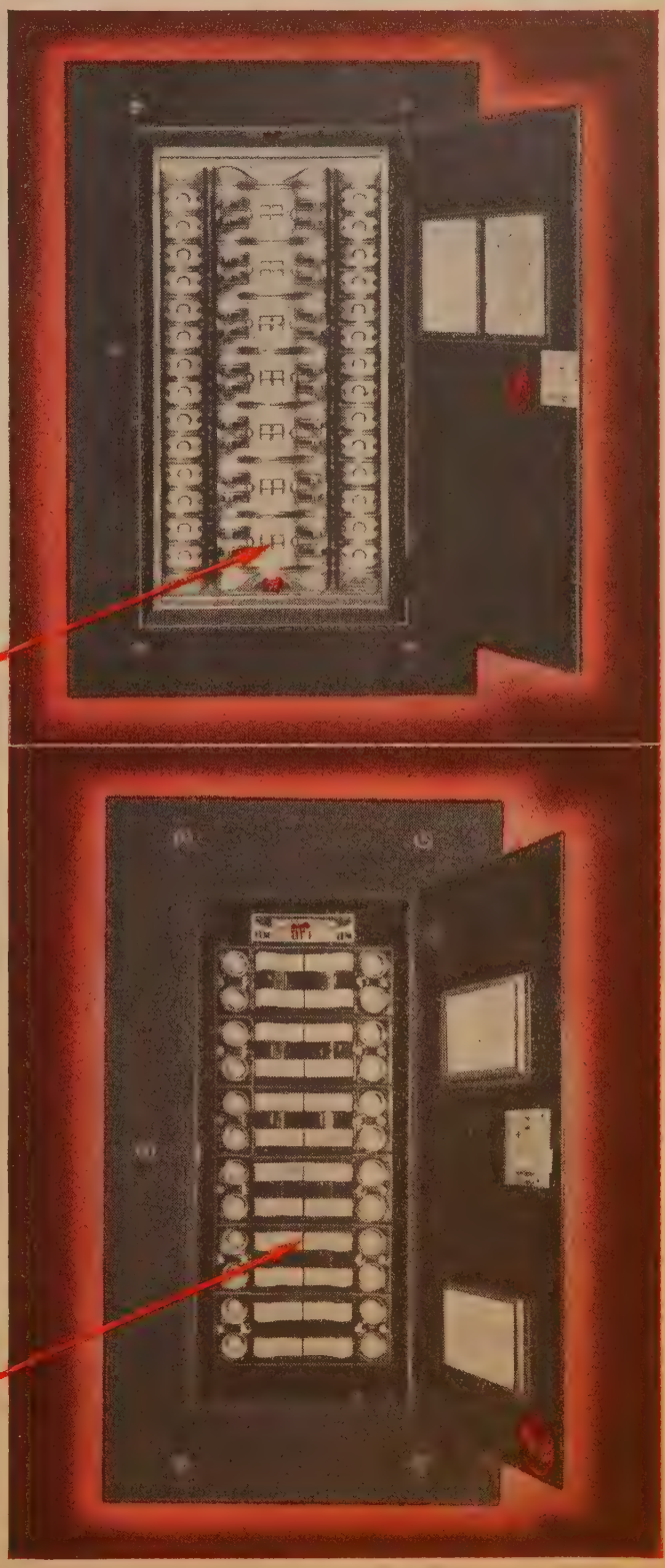
Branch circuit units are sturdily designed of porcelain—the best insulating material known to the electrical industry. Porcelain is arc-resisting, non-carbonizing and non-tracking.

Switches are designed to reduce handle breakage. Quick-make and quick-break action, and friction-free knife edge bearings cut maintenance costs.

For full information on BullDog SUPERBA or ROCKER-TYPE lighting panelboards, call your BullDog Field Engineer. Or, write BullDog direct for folders.



Cutaway view of ROCKER-TYPE porcelain unit designed for rugged durability, maximum dielectric strength and heat resistance plus simplified switch mechanism with unbreakable rocker handles.



ADEQUATE WIRING SERVES AND SAVES

BULLDOG

ELECTRIC PRODUCTS COMPANY

BullDog manufactures Vacu-Break Safety Switches—SafToFuse Panelboards—Superba and Rocker Type Lighting Panels—Switchboards—Circuit Master Breakers—"Lo-X" Feeder BUStribution DUCT—"Plug-in" Type BUStribution DUCT—Universal Trol-E-Duct for flexible lighting—Industrial Trol-E-Duct for portable tools, cranes, hoists.

Detroit 32, Mich. Field Offices In All Principal Cities. In Canada: BullDog Electric Products of Canada, Ltd., Toronto

RED GIANT LIFTRUCKS

RED GIANTS are made single, double and multiple stroke hydraulic, with capacities up to 15,000 lbs. Timken bearings on all models.

REVOLVATOR PORTABLE ELEVATORS

27 Standard Models, hand, electric or combination, revolvable or non-revolvable base, hinged or telescopic top, platforms for all types of material. Send for bulletins.

QUICK and EFFICIENT

Whether or not you require heavy and expensive power trucks for major moving operations, you need RED GIANT hand liftrucks every day. For loading and unloading jobs, for horizontal moving in crowded quarters or on light floors these sturdy, dependable machines are indispensable. Some plants have dozens in use. All of them save time, labor and money.

REVOLVATOR CO.

DESIGNERS AND MANUFACTURERS OF MATERIAL HANDLING EQUIPMENT

8720 Tonnele Ave. NORTH BERGEN, N. J. Since 1904

Stop Rust...and Save with RUST-OLEUM

Rust-Oleum slashes maintenance costs 3 ways. It's enduring protective coating seals metal against rust-forming elements. Nothing equals it as a positive, low-cost rust preventive!

1. IT CUTS PREPARATION TIME!
No sandblasting or chemical cleaners are necessary. Quick wirebrushing removes paint scale, blisters, dirt, etc.

2. IT GOES ON FASTER!
Rust-Oleum saves 25% of the time ordinarily required for application and covers 30% more area than ordinary materials.

3. IT PROTECTS LONGER!
Rust-Oleum outlasts ordinary paint two to ten times, depending upon conditions under which it is used. This means maximum savings on every application.

FREE: New Rust-Oleum catalog showing colors and applications. Write us or your distributor *today!*

RUST-OLEUM CORPORATION
2411 Oakton Street, Evanston, Illinois

(Continued from page 304)

All net values are at factories after additions and deductions for variation from standard specifications, trade in allowances, etc., when applicable. No adjustment has been made for cancellation of the following bookings: thirteen fork trucks, value $60,588; three ram trucks, value $47,116.20; one tractor, value $1700.

• Clothing Workers' Pension Plan Begins Payoff

Reserves have accumulated to a point where disbursements from the retirement fund for the Amalgamated Clothing Workers of America, CIO, are to begin this month. The old-age pension payments operate on an industry-wide basis under a union-management retirement plan said to cover 9% of the 150,000 workers in the industry in over 30 states.

The plan was negotiated between the Amalgamated Clothing Workers and the Clothing Manufacturers Association of the United States and the fund is supported solely by the employers who contribute the equivalent of 3% of their weekly pay rolls.

The first group to receive payments numbers 2200. Workers are eligible when they retire if they are 70 years old or more and have been employed in the industry for at least 20 years. Reserves are now being built up to permit retirement some time in 1948 for union members reaching the age 65.

• ASA Meeting

The twenty-eighth annual meeting of the American Standards Association was held at the Waldorf Astoria Hotel, New York, in November. Henry B. Bryans, executive vice president of the Philadelphia Electric Co. and retiring president of the American Standards Association, welcomed the group and reported on the increase of membership during the past year.

The present membership, he pointed out, is comprised of 58 member-bodies, 38 associate members, and about 2000 companies. Outlining new projects for the association, Mr. Bryans explained that of standardization of office equipment and supplies, a project which in its broad conception will affect every business office in the country, he said. Another project recently suggested by the Optical Society of America is in the field of optics. Subcommittees will be named to

(Continued on page 308)

Let's look at the Record!

As we start on our 101st year of making valves for industry, we feel that the past record of Powell Valves throughout 100 years of meeting *every* industrial flow control requirement as it has arisen constitutes a definite assurance of future performance.

So, whenever you need valves—for replacements or for new installations—consult Powell. If you have any flow control problems, Powell engineers will be glad to help you solve them.

The Wm. Powell Co., Cincinnati 22, Ohio

DISTRIBUTORS AND STOCKS IN ALL PRINCIPAL CITIES

Catalogs on request. Kindly state whether you are chiefly interested in Bronze, Iron, Cast Steel, or Corrosion-Resistant Valves.

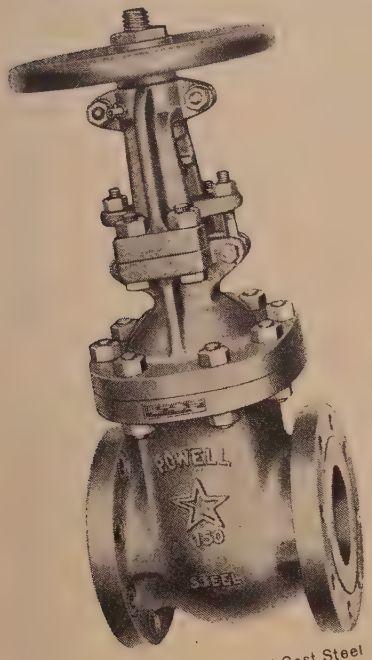


Fig. 1503—Class 150-pound Cast Steel Gate Valve. Has flanged ends, outside screw rising stem, bolted flanged yoke and taper wedge solid disc.

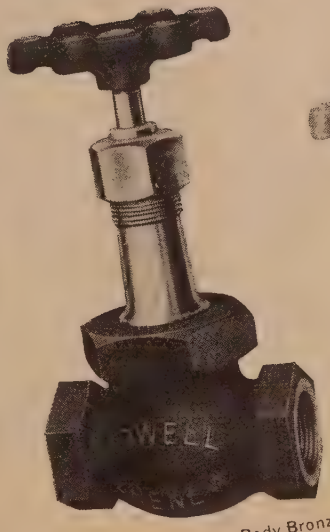


Fig. 190—150-pound Iron Body Bronze Mounted "Irenew" Globe Valve. Has screwed ends, Union bonnet and regrindable, renewable wear-resisting "Powellium" seat and disc.

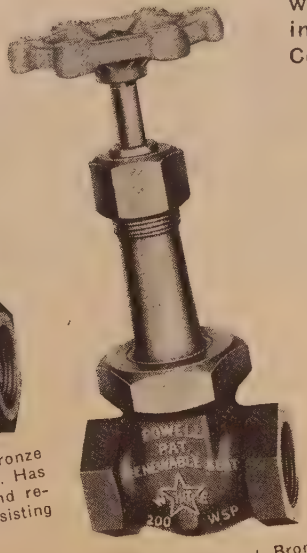


Fig. 1375—200-pound Bronze Gate Valve, with screwed ends, inside screw rising stem, union bonnet and wear-resisting "Powellium" nickel-bronze seat rings and disc.

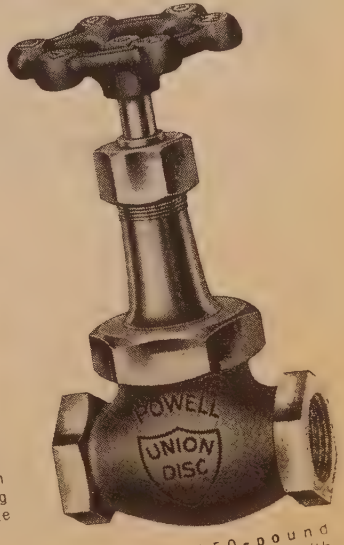


Fig. 150—150-pound Bronze Globe Valve with screwed ends, union bonnet and renewable composition disc.

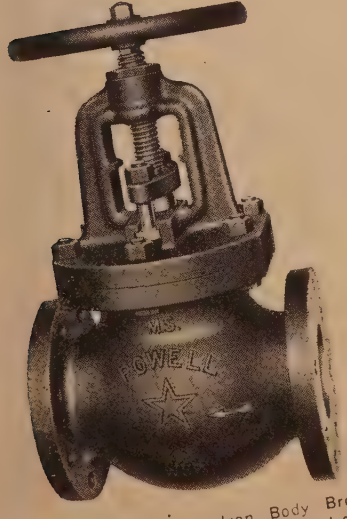


Fig. 301—125-pound Iron Body Bronze Mounted Globe Valve. Has flanged ends outside screw rising stem, bolted flanged yoke, renewable bronze seat and composition disc.

Fig. 559—125-pound Iron Body Bronze Mounted Swing Check Valve with bolted flanged cap and regrindable, renewable bronze seat and disc.

Fig. 560—200-pound Bronze Regrinding Horizontal Swing Check Valve. Screwed ends, screwed cap and regrindable, renewable bronze disc.

POWELL VALVES

FASTER
FIRE STOPPING POWER
WITH
THE MASTER OF FLAME
ANSUL
FIRE EXTINGUISHING EQUIPMENT
dug Gas
DRY CHEMICAL
FIRE EXTINGUISHERS

Greatly increased fire-killing capacity.

Simplified operation.

Expert performance by inexperienced operators.

Quick, easier on-the-spot recharge after use.

More fire stopping power pound for pound, dollar for dollar.

Greater heat-shielding protection for operator.

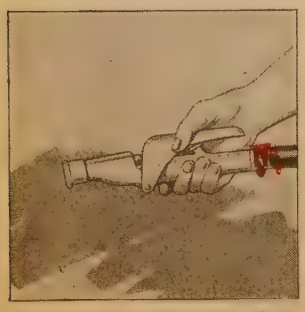
Increased fire-fighting capacity without increased weight.

Engineered to resist corrosion.

Install the NEW Ansul-Dugas Extinguishers at all hazard spots for greater protection against all fires involving flammable liquids, gases and electrical equipment.

Ready...in a Flash!

- Simply remove ringpin and push lever down.



- Open nozzle and direct chemical stream at base of flames.

53% More...
FIRE STOPPING POWER
with the NEW FASTER ACTING
ANSUL-DUGAS
FIRE EXTINGUISHERS

Write today for new catalog and authoritative data showing characteristics of all types of approved hand fire extinguishers.

Listed and Approved by Underwriters' Laboratories and Factory Mutual Laboratories.

ANSUL CHEMICAL COMPANY
FIRE EXTINGUISHER DIVISION • MARINETTE, WIS.

(Continued from page 306)

handle matters such as nomenclature, definitions, symbols, sources of optical energy, color measurements, etc.

A paper on the Review of the Standards Council by L. F. Adams, acting chairman of the Standards Council and manager of the Standards Division, executive department, General Electric Co., was read by E. Cyril Ainsworth of the association. Pointed out was the question, at the war's end, as to how much of the technical work done on wartime project could be put to peacetime use. A reviewing procedure of emergency war standards developed in that period is going on. To date, it was reported, the procedure has resulted in reaffirmation of 15 standards, leaving 138 to be disposed of.

"What the Consumer Wants in Standardization" was the subject of a talk by Mrs. Guy Moffett, an association director and a member of the American Association of University Women and the American Home Economics Association.

"The kind of standardization we want as ultimate consumers is that which answers the questions in our minds when we shop," Mrs. Moffett said. Questions which she cited that should be answered are: How much are we getting at a given price? How safe is it? What is the size and fit? What does the name or descriptive adjective mean? What is the article's relative worth? Is the article worth anything at all?

Howard Coonley, chairman of the executive committee of the association, spoke on "Industry's Stake in Standardization," and Ephraim Freedman, director of R. H Macy & Company's Bureau of Standards, spoke on "Standards and Free Enterprise."

Frederick R. Lack, vice president of Western Electric Co., will be president of the American Standards Association this year succeeding Mr. Bryans. New vice president is George H. Taber, Jr., executive vice president of the Sinclair Refining Co.

Free literature—

Post card between

pages 174 & 175

When the going gets tough...

You need a man like this. He's your Industrial Supply Specialist. He knows your bulk materials must be moved fast and efficiently.

He knows, too, that you can't afford to run the risk of costly shutdowns caused by inefficient conveyor belting or machinery. That's why you can count on him to recommend equipment that will withstand severe punishment . . . carry more tons per dollar.

When you have to move heavy loads, for example, he will recommend Monarch Conveyor Belting and Robins Conveyors. They're "Job-Engineered" by Hewitt-Robins to withstand the most severe operating conditions.

You see, Hewitt-Robins offers you complete materials handling service. It is backed by a single source and single responsibility for both conveyor machinery and belting.

So, *before* the going gets tough, call your Industrial Supply Specialist. He will recommend the Hewitt belting best suited to do your job cheaper, faster, and better.

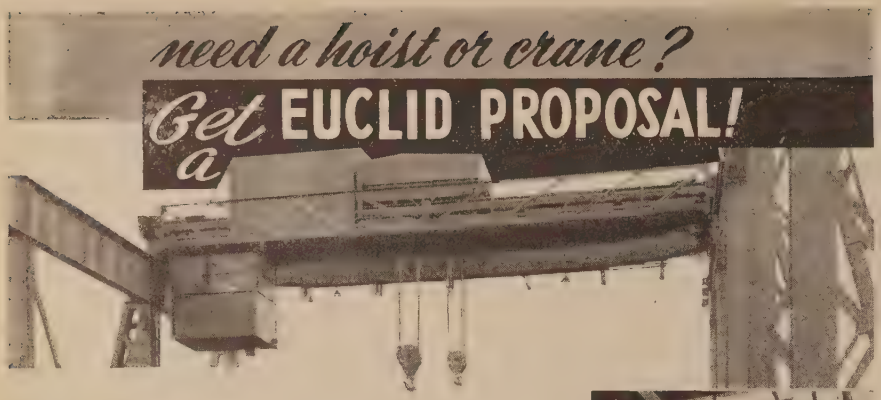
•

Specify "Hewitt" . . . Phone the Hewitt distributor listed in the classified section of your phone directory. Or write to Hewitt Rubber of Buffalo, 240 Kensington Ave., Buffalo 5, N. Y.

Monarch Conveyor Belting

HEWITT RUBBER
OF BUFFALO
Division of Hewitt-Robins Incorporated

"JOB-ENGINEERED" INDUSTRIAL HOSE • BELTING • PACKING



Several decades of specialized building experience have gained for EUCLID CRANES and HOISTS wide acceptance in the various heavy industries and standardization on these units by discriminating manufacturers.

Special units are built when justified by unusual conditions but standard cranes and hoists are available in types, capacities and kinds of control to meet the demands of various industries.

Write for Illustrated Catalog

THE EUCLID CRANE & HOIST CO.

1361 Chardon Road **Euclid, Ohio**

The story of a little pump!

WRITE FOR YOUR COPY

The latest addition to the Ingersoll-Rand line is the class KRVS circulating pump. These units have wide adaptability in food, beverage and dairy products plants, in air conditioning systems or on machine tools, plus many other applications.

Form 7126 gives you full details, including dimensions and selections to suit your conditions. Write for your copy today.

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C-912

COMPANY ACTIVITIES

● Representatives Named

C. E. Hamilton, 1411 Fourth Ave. Building, Seattle, Wash., and A. B. Andrews, Jr., Insurance Building, Raleigh, N. C., have been appointed representatives for industrial products manufactured by The Tomkins - Johnson Co., Jackson, Mich., it has been announced by D. M. J. Tracey, general manager.

● Structural Arc Welding

A pre-fabricated shop building of standard universal design, available in various sizes and for various uses, that is sold all over the world by the Butler Manufacturing Co., of Kansas City, Mo., offers an outstanding example of how structural electric arc welding can be applied to obtain rigid construction and clean interior, according to information received from the Lincoln Electric Co., Cleveland, Ohio, manufacturer of electric arc welding equipment.

The building, shown under construction, in the accompanying illustration, is for occupancy when completed by a steel fabricating company. Less steel is used in welded rigid connections than in conventional truss and column construction, Butler Manufacturing reports, which provides the most economical structure for this type of shop building.

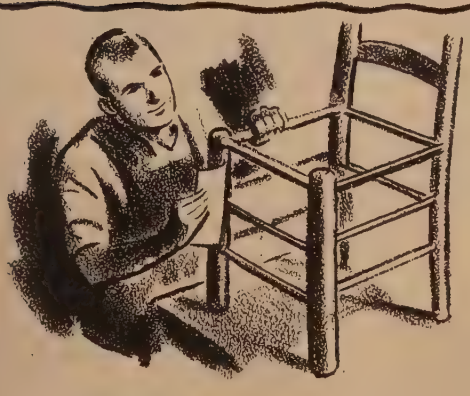
All of the primary members were made up of plate steel. Substitutions in the thicknesses of the plate steel could be freely made because of the arc welded construction. The complete bracing system is made up of structural angles (see illustration), and the strut members are built up from angle irons and rods before welding.

The struts, columns, haunches, roof beams and purlins were shop fabricated, which left the final assembly of rigid frames and craneway for fabrication at the building sites. The columns and haunches

(Continued on page 312)

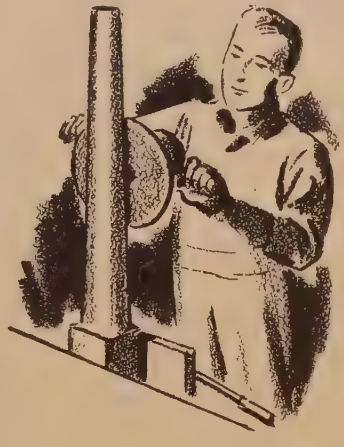
"Sandpaper" For Legs

ONE GRADE of Jewel sandpaper is so fine that it has found widespread use for depilatory mittens. Less glamorous legs require different smoothing techniques.



For woodworking, special Jewel Garnet, prepared by an exclusive process, is rapidly replacing more expensive artificial abrasives.

In the metal-working field, Weldisks with their safety backing and Bondex adhesive offer fast, clean cutting, with accident protection and long wearing qualities as definite Jewel "plus" values.



For grinding and polishing metals, Silver Streak abrasive belts provide a heat-resistant grinding medium, free from metal "scorch" and adhesive melting, with its grit-clogging and consequent short life.

Remember Jewel Abrasives next time you order from your jobber. There's a Jewel product for *every* grinding and polishing job.

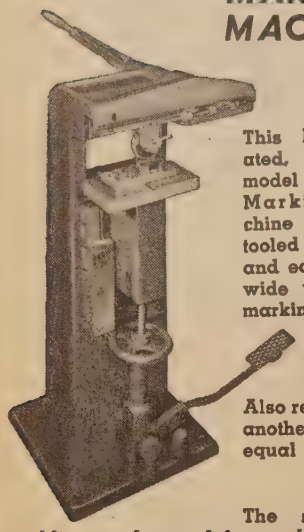
ABRASIVE PRODUCTS INC. JEWEL ABRASIVES MADE IN U.S.A. SOUTH BRAINTREE, MASS. U.S.A.

Abrasive Products, Inc.

SOUTH BRAINTREE 85, MASSACHUSETTS • MAKERS OF JEWEL COATED ABRASIVES

THE RIGHT PAIR FOR PRECISION MARKING

UNIVERSAL MARKING MACHINE



This hand-operated, pedestal model Universal Marking Machine can be tooled quickly and easily for a wide variety of marking jobs.

Also retooled for another job with equal ease!

The same assembly may be used for marking either flat or cylindrical surfaces—merely changing the type holder and cradle.

Regulating screws and other simple adjustments make set-up unusually easy.

Send us work sample or blueprint today of your marking jobs.

PRYOR TYPE

Pryor's Interchangeable Steel Marking Type is "a toolmaker's type" because:

—it's engraved on three-dimensional pantographs—no swaging to set up stresses and strains.
—the finish is microscope-checked for accuracy of bevel and exact centering of character.
—it's made of tested Sheffield alloy tool steel.
—the finest tolerance of finish is maintained.

Comes packed with a hand holder in a permanent oak case.

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INCORPORATED
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3000 West Chicago Ave., Chicago 22, Ill.
682 Mission St., San Francisco 5, Cal.
3652 Northcliffe Ave., Montreal 28, Can.

(Continued from page 310)

were tapered to reduce the structural tonnage required to carry the design load.

All columns are automatically welded with the "Lincolnweld" process.

The welded connections at the eaves and at the third points of the roof are field welded. Bolted joints, noticed at the top of the pre-fabricated structure are used only during primary erections. Later, when the building is being permanently erected, the joints at the top and on all the sides are arc welded to assure permanent rigidity and strength.

Joints were tack welded before finish welding was accomplished, and all work was first fitted to templates before the finish welding was done. The shop building was welded exclusively with "Fleetweld 7" and "5" electrodes.

The finished structure has a floor space area of 31,200 sq. ft., being 400 x 78, with a roof height of 40 ft. 6", and is comprised of 20 ridge struts, 40 girt struts, 40 eave struts and 21 rigid frames. The structure, when completed, is covered with corrugated galvanized sheets.

● Greene, Tweed & Co. Move

Greene, Tweed & Co. has vacated its New York works and incorporated all facilities under one supervision in its plant at North Wales, Pa., in an effort to provide greater efficiency and services for users and distributors of its products.

● Use of X ray

X ray, with its myriad uses, also has an important application in the manufacture of electronic tubes, from facilitating design to final testing.

Here it is used by a General Electric Co. employe, Rita Delaney, in checking the internal construction of a television power tube, upper

(Continued on page 314)

IT CAN HAPPEN *in YOUR plant*

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QUIK-SIL
TRADE MARK
The Modern
OIL AND GREASE
ABSORBENT

ON OILY, GREASY FLOORS

Now . . . with production volume vitally important you can't afford to gamble with lost manpower hours from floor slipping accidents. QUIK-SIL dries oil and grease with amazing speed. Gives safe footing for workers and makes floors safer for power trucking. Increases leather belting life. Won't harm shoe soles and heels, clothing, hands, floor surfaces. Makes floors easier to clean.

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True Fastener Economy

It is the many costs of using a fastener that count . . . not just the initial price. *True Fastener Economy* is the lowest *total* cost for fastener selection, purchase, assembly and performance.

YOU GET t.f.e. WHEN YOU . . .

1. Reduce assembly time to a minimum by savings through use of accurate and uniform fasteners
2. Make your men happier by giving them fasteners that make their work easier
3. Reduce need for thorough plant inspection, due to confidence in supplier's quality control
4. Reduce the number and size of fasteners by proper design
5. Purchase maximum holding power per dollar of initial cost, by specifying correct type and size of fasteners
6. Simplify inventories by standardizing on fewer types and sizes of fasteners
7. Save purchasing time by buying larger quantities from one supplier's complete line
8. Contribute to sales value of final product by using fasteners with a reputation for dependability and finish

RUSSELL, BURDSALL & WARD BOLT AND NUT COMPANY

102 years making strong
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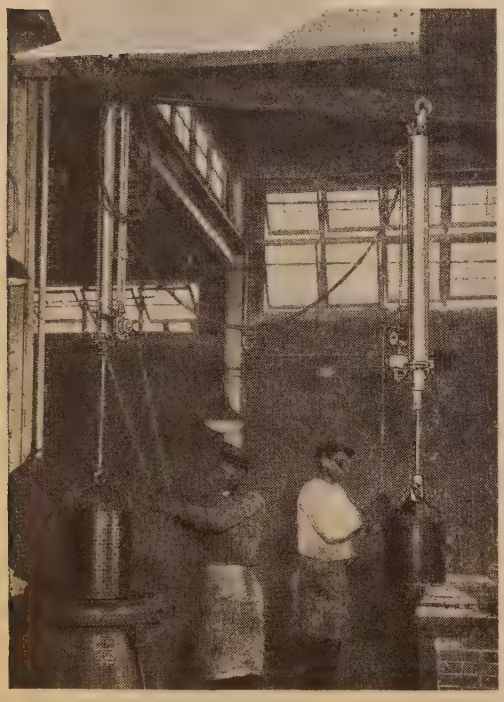
Plants at Port Chester, N. Y., Coraopolis, Pa., Rock Falls, Ill., Los Angeles, Calif. Additional sales offices at Philadelphia, Detroit, Chicago, Chattanooga, Portland, Seattle. Distributors from coast to coast. By ordering through your distributor, you can get prompt service for your normal needs from his stocks. *Also*—the industry's most complete, easiest-to-use catalog.

"Low Cost, Long Service, Small Maintenance"

says Maurer Supply Co. about

CURTIS AIR HOISTS



The Maurer Supply Co., St. Louis, uses Curtis Air Hoists to raise and lower parts in hot-dip galvanizing work. Among other advantages, they have found that the rigid rod in Curtis hoists eliminates swinging; that the positive control of loads is essential to such work and provides a maximum of safety to the operators. Working under severe conditions of acids and heat, these Curtis Air Hoists are giving "trouble-free service" and enabling this company "to perform an operation impossible without them."

Curtis Air Hoists have a proven record of saving time and labor in many lifting, pushing or pulling operations. They offer:

Low first.cost; lowest operating expense.
Smooth, fast, accurate control of loads.
Finger-tip control.
Light weight; cannot be overloaded.
Capacities up to 10 tons.

For complete information on Curtis Air Hoists, Air Cylinders and Air Compressors, write for Bulletin C-7.

CURTIS PNEUMATIC MACHINERY DIVISION
of Curtis Manufacturing Company
1997 Kienlen Avenue St. Louis 20, Missouri

H-530

CURTIS PNEUMATIC MACHINERY DIVISION
of Curtis Manufacturing Company
1997 Kienlen Avenue, St. Louis 20, Missouri

Please send me Form C-7 on Curtis Air Hoists, Air Cylinders and Curtis Air Compressors.

Name.....
Firm.....
Street.....
City.....Zone..... State.....

92 Years of Successful Manufacturing

(Continued from page 312)

left, and a cost-reducing FM transmitter Phasitron tube, upper right. Tube Division engineers of the company's Electronics Department x-ray many tubes as an aid to tube manufacture.

- **Midget Furnace Introduced**

James S. Knowlson, right, chairman of the board and president of Stewart-Warner Corp., carries first model of the new midget furnace. Lynn A. Williams, Jr., vice president, has charge of the South Wind Division.

Unveiling of the long-heralded Stewart-Warner South Wind home heating unit, or "midget furnace," took place recently at the Waldorf-Astoria hotel in New York where Lynn A. Williams, Jr., vice president of Stewart-Warner Corp. in charge of the heater division, told how the new heating unit had grown out of the corporation's wartime development of aircraft heating equipment.

Simultaneously, the new unit was displayed in Indianapolis, home of the Stewart-Warner heater division.

The new midget furnace is a gas-burning unit about the size of a suitcase. It can be easily installed in three hours or less by one person, occupies no otherwise usable space in a home, and gives automatic heating without a large and costly central heating plant with a chimney and network of ducts or pipes and radiators.

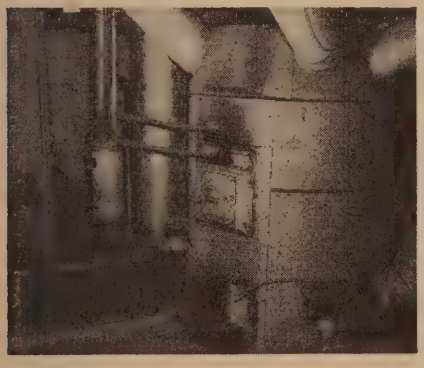
Pointing out the direct connection between wartime research and development, and the South Wind midget furnace, Mr. Williams said, "The things we learned as a result of the war permitted us to make a new approach to the problem of heating houses. Today, just two and a half years after our revelation of the possibility of making home heating devices based upon aircraft heating equipment, we are able to announce that we have com-

(Continued on page 317)

(Continued from page 314)

pleted the development work and that we are now well along in a program of manufacturing these new and revolutionary heating devices in very large quantities."

The key feature of the South Wind midget furnace is the sealed flame system. This makes it possible for it to burn the fuel in a confined, sealed space, which permits small, sealed metal tubes for venting the unit, instead of a chimney.



Comparison of midget furnace and typical basement furnace.

"In April, 1944," said Mr. Williams, "when we told about Stewart-Warner's development of airplane heaters, we stated candidly that there were at least three problems which would have to be overcome before we could announce our readiness to produce home heating units based on the same principles.

"These three problems were: that the airplane heaters burned gasoline and we did not think that was a good fuel for household use; they were noisy; and they required more attention than should be the case with a home appliance.

New Way of Heating

"The solution of these problems and others that arose during our development work, has given rise to what we consider to be an altogether revolutionary concept for heating houses.

"That concept is that a separate tiny furnace, about the size of a suitcase, can be hidden away in each zone of the house, to supply heat for that particular zone, with individualized thermostatic zone control, and with a modulated flow of heat in which the output is adjusted gradually to the requirements of the rooms, and not by turning the device off and on.

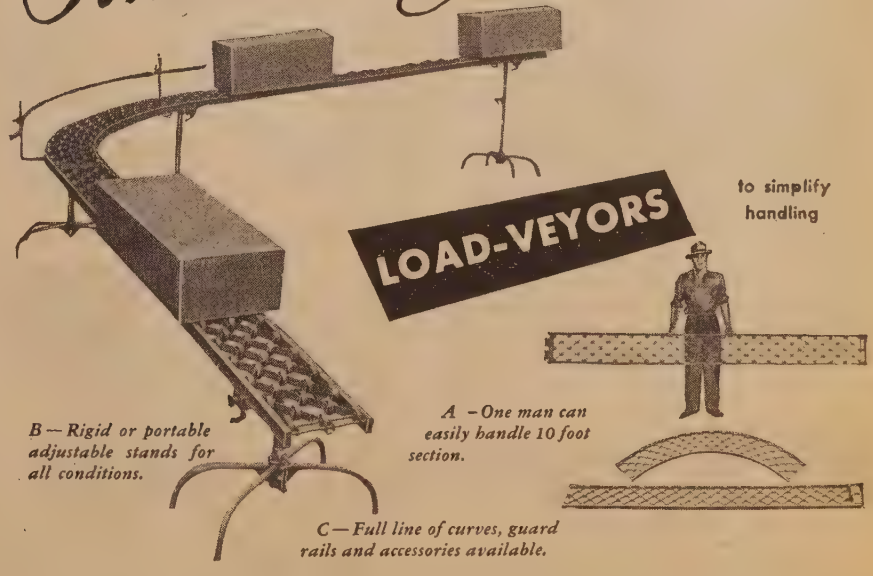
"For the South Wind home heating unit, or midget furnace, we selected gas as the fuel to be used—

(Continued on page 318)

Standardized
MATERIALS HANDLING EQUIPMENT

we want DISTRIBUTORS for this

Outstanding Line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B—Rigid or portable adjustable stands for all conditions.
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Shown here are but *two* performers in our *complete* line of standardized materials handling equipment.

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Also included in our complete line of Standardized Materials Handling Equipment:

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WITH "3-POINT LANDING"
Here's just the cart you need for wheeling coal, scrap, chips, turnings, borings and similar heavy materials. All-steel, completely welded and reinforced. Made extra strong and rugged for heavy duty service. Dumps easily. Rests securely in any one of the three positions shown here. Available with roller bearings, if desired.
Write for Circular No. 50.
STERLING WHEELBARROW CO., Milwaukee 14, Wis.
Look for this Mark of STERLING Quality
Sterling WHEELBARROWS

(Continued from page 317)

city gas, manufactured gas, natural gas or bottled gas. This fuel is easy to use. It is clean. Its cost is constantly going downward. And it is safe."

As for noise, Mr. Williams said, the unit is so quiet that it can be put in any room, and never disturbs the occupants. Long, trouble-free service also has been engineered into the midget furnace.

Unit Heats 2½ Rooms

Each South Wind home heating unit has a capacity sufficient to heat about two and one-half rooms. The units are small enough so that they can be recessed in a wall between two rooms and distribute heat to each of the rooms, or they can be tucked away above the top shelf in a closet and distribute heat to two or three rooms through short lengths of ducts, perhaps a foot or a foot and a half long. They can be placed beneath the floor, or in the floor, in the ceiling, or in the attic. They are out of the way, and neither they nor any ducts connected with them require any special provisions or use any space otherwise needed.

The heating unit is 14" wide, so

(Continued on page 319)

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Established 1876

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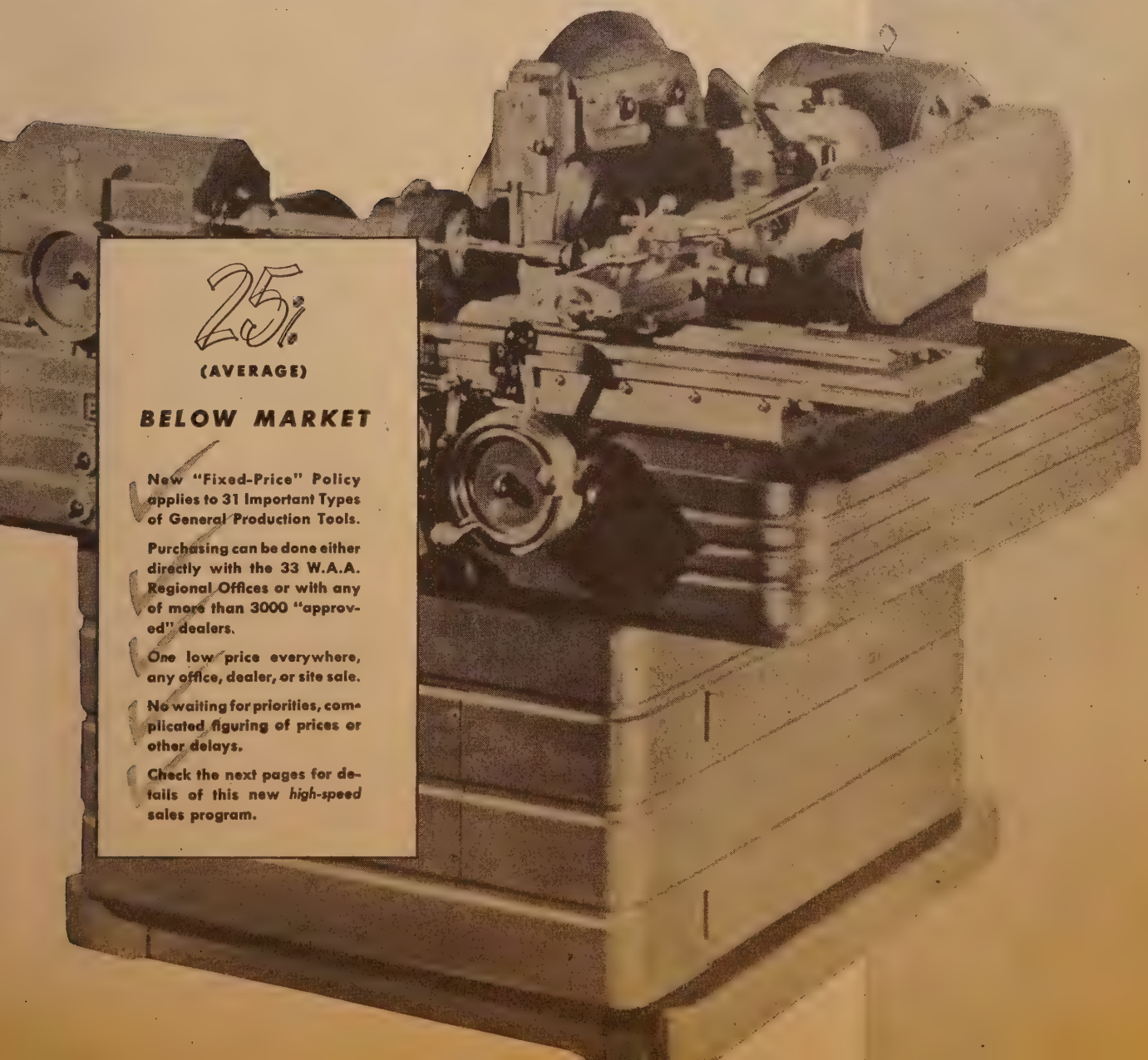
SURPLUS MACHINE TOOLS



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Purchasing can be done either directly with the 33 W.A.A. Regional Offices or with any of more than 3000 "approved" dealers.

One low price everywhere, any office, dealer, or site sale.

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Check the next pages for details of this new *high-speed* sales program.

BORING MACHINE — HORIZONTAL, PRECISION, BRIDGE TYPE, SINGLE END

Manufacturer: EX-CELL-O CORPORATION, DETROIT, MICH.

MODEL	SIZE AND CAPACITY	SALES PRICE
2112-A Single End	6" diameter bore, x 12" table travel	$ 720.00
2112-A Single End	6" diameter bore, x 15" table travel	655.00
112-C Single End	8" diameter bore, x 16" table travel	1036.00
112-C Single End	8" diameter bore, x 20" table travel	1139.00
Manufacturer: THE HEALD MACHINE COMPANY, WORCESTER, MASS.		
45 Bore-Matic, Standard, Single End	12" diameter bore, x 16" table travel	$ 1993.00
46-B Bore-Matic, Standard, Single End	9" diameter bore, x 14" table travel	1451.00
47-A Bore-Matic, Standard, Single End	9" diameter bore, x 13-5/8" table travel	1178.00
47-A Bore-Matic, Special, Single End	9" diameter bore, x 15" table travel	1186.00
48 Bore-Matic, Single End	6" diameter bore, x 9" table travel	714.00
48-A Bore-Matic, Single End	6" diameter bore, x 12" table travel	714.00
49 Bore-Matic, Standard, Single End	6" diameter bore, x 12" table travel	1116.00
Manufacturer: STOKERUNIT CORPORATION, MILWAUKEE, WIS.		
Mod. 1 Horizontal Single End	4" diameter bore, x 9" table travel	354.00
Mod. 2-B Horizontal, Single End	8" diameter bore, x 15" table travel	444.00

DRILL PRESS — FLOOR TYPE SINGLE OR MULTIPLE SPINDLE

(EXCEPT 110 VOLT, SINGLE PHASE)

Manufacturer: ALLEN—CHARLES C. ALLEN CO., BARRE, MASS.

MODEL	SIZE AND CAPACITY	SALES PRICE
HMD—Super Speed (Floor	5/16" drill capacity, 16" swing, 3 spindle	$ 511.00
HMD—Super Speed (Floor)	5/16" drill capacity, 16" swing, 4 spindle	657.00
HMD—Super Speed (Floor)	5/16" drill capacity, 16" swing, 6 spindle	$ 948.00
HMD—Super Speed (Floor)	5/16" drill capacity, 24" swing, 1 spindle	229.00
HMD—Super Speed (Floor)	5/16" drill capacity, 24" swing, 2 spindle	382.00
HMD—Super Speed (Floor)	5/16" drill capacity, 24" swing, 3 spindle	535.00
2-KH (Floor)	5/8" drill capacity, 14" swing, 1 spindle	$ 177.00
2-KH (Floor)	5/8" drill capacity, 14" swing, 2 spindle	279.00
2-KH (Floor)	5/8" drill capacity, 14" swing, 3 spindle	381.00
2-KH (Floor)	5/8" drill capacity, 14" swing, 4 spindle	483.00
2-KH (Floor)	5/8" drill capacity, 14" swing, 6 spindle	687.00
2-KH (Floor)	5/8" drill capacity, 24" swing, 1 spindle	$ 185.00
2-KH (Floor)	5/8" drill capacity, 24" swing, 2 spindle	295.00
2-KH (Floor)	5/8" drill capacity, 24" swing, 3 spindle	394.00
2-KH (Floor)	5/8" drill capacity, 24" swing, 4 spindle	513.00
2-KH (Floor)	5/8" drill capacity, 24" swing, 6 spindle	732.00
2-MSV (Floor)	7/8" drill capacity, 16" swing, 1 spindle	$ 240.00
2-MS (Floor)	7/8" drill capacity, 16" swing, 2 spindle	449.00
2-MS (Floor)	7/8" drill capacity, 24" swing, 2 spindle	469.00
2-MS (Floor)	7/8" drill capacity, 24" swing, 4 spindle	910.00
2-MS (Floor)	7/8" drill capacity, 30" swing, 3 spindle	718.00
2-V Belted (Floor)	7/8" drill capacity, 16" swing, 1 spindle	$ 184.00
2-V Belted (Floor)	7/8" drill capacity, 16" swing, 2 spindle	266.00
2-V Belted (Floor)	7/8" drill capacity, 16" swing, 4 spindle	440.00
2-V Belted (Floor)	7/8" drill capacity, 24" swing, 3 spindle	382.00
2-V Belted (Floor)	7/8" drill capacity, 30" swing, 1 spindle	196.00
2-1/2 MSV (Floor)	1-1/8" drill capacity, 16" swing, 2 spindle	$ 449.00
2-1/2 MSV (Floor)	1-1/8" drill capacity, 16" swing, 4 spindle	810.00
2-1/2 MSV (Floor)	1-1/8" drill capacity, 16" swing, 6 spindle	1171.00
2-1/2 MSV (Floor)	1-1/8" drill capacity, 24" swing, 1 spindle	281.00
2-1/2 MSV (Floor)	1-1/8" drill capacity, 24" swing, 2 spindle	469.00
2-1/2 MSV (Floor)	1-1/8" drill capacity, 24" swing, 4 spindle	845.00
2-1/2 MSV (Floor)	1-1/8" drill capacity, 24" swing, 5 spindle	1033.00
3-V Belted (Floor)	1-1/4" drill capacity, 24" swing, 1 spindle	268.00
3-V Belted (Floor)	1-1/4" drill capacity, 24" swing, 2 spindle	449.00
3-V Belted (Floor)	1-1/4" drill capacity, 24" swing, 3 spindle	632.00
Manufacturer: AVEY DRILLING MACHINE CO., CINCINNATI, OHIO		
1-MA-6 Floor, Box Column	1/2" drill capacity, 15" swing, 1 spindle	$ 175.00
2-MA-6 Floor, Box Column	7/8" drill capacity, 15" swing, 1 spindle	243.00
2-MA-6 Floor, Box Column	7/8" drill capacity, 15" swing, 2 spindle	$ 448.00
2-MA-6 Floor, Box Column	7/8" drill capacity, 15" swing, 3 spindle	652.00
2-MA-6 Floor, Box Column	7/8" drill capacity, 15" swing, 4 spindle	856.00
2-MA-6 Floor, Box Column	7/8" drill capacity, 24" swing, 4 spindle	710.00
2-MA-6 Floor, Box Column	7/8" drill capacity, 24" swing, 5 spindle	877.00
2-MA-6 Floor, Box Column	7/8" drill capacity, 24" swing, 6 spindle	$ 1044.00
2-MA-6 Floor, Box Column	7/8" drill capacity, 30" swing, 3 spindle	729.00
No. 3 Belted, Floor, Box Column	1" drill capacity, 24" swing, 1 spindle	249.00
3-MA-6 Floor, Box Column	1-1/8" drill capacity, 24" swing, 6 spindle	2122.00
3-MA-6 Floor, Box Column	1-1/4" drill capacity, 24" swing, 1 spindle	390.00
3-MA-6 Floor, Box Column	1-1/4" drill capacity, 24" swing, 3 spindle	$ 1083.00
3-MA-6 Floor, Box Column	1-1/4" drill capacity, 24" swing, 6 spindle	2122.00
3-BMA-1 Floor, Box Column	1-1/4" drill capacity, 24" swing, 1 spindle	279.00
3-BMA-1 Floor, Box Column	1-1/4" drill capacity, 24" swing, 3 spindle	754.00
No. 3 Standard Floor, Box Column	1-1/4" drill capacity, 24" swing, 3 spindle	614.00
No. 3 Standard Floor, Box Column	1-1/4" drill capacity, 24" swing, 4 spindle	791.00
Manufacturer: BUFFALO FORGE COMPANY, BUFFALO, N. Y.		
Model 14 Pedestal, Box Column, "High-Speed"	1/2" drill capacity, 14" swing, 1 spindle	$ 120.00
Model 2, Floor, Box Column, "Motor Spindle"	7/8" drill capacity, 16" swing, 1 spindle	243.00
Model 2 Floor, Box Column, "Motor Spindle"	7/8" drill capacity, 26" swing, 1 spindle	266.00

just look at these typical

Manufacturer: CANEDY-OTTO MFG. CO., CHICAGO HEIGHTS, ILL.

No. 5000-FV Floor, Box Column	3/8" drill capacity, 16" swing, 1 spindle	$ 172.00

Manufacturer: EDLUND MACHINERY CO., INC., CORTLAND, N. Y.

1-B-7" Floor Type	3/8" drill capacity, 14" swing, 1 spindle	$ 140.00
1-B-7" Floor Type	3/8" drill capacity, 14" swing, 2 spindle	239.00
1-B-7" Floor Type	3/8" drill capacity, 14" swing, 3 spindle	330.00
1-B-7" Floor Type	3/8" drill capacity, 14" swing, 4 spindle	391.00
1-B-7" Floor Type	3/8" drill capacity, 14" swing, 6 spindle	604.00
1-B-12" Floor Type	3/8" drill capacity, 24" swing, 1 spindle	$ 152.00
1-B-12" Floor Type	3/8" drill capacity, 24" swing, 3 spindle	348.00
1-B-12" Floor Type	3/8" drill capacity, 24" swing, 4 spindle	411.00
2-B- 8" Floor Type	3/4" drill capacity, 16" swing, 1 spindle	195.00
2-B- 8" Floor Type	3/4" drill capacity, 16" swing, 2 spindle	356.00
2-B- 8" Floor Type	3/4" drill capacity, 16" swing, 3 spindle	$ 524.00
2-B- 8" Floor Type	3/4" drill capacity, 16" swing, 4 spindle	691.00
2-B- 8" Floor Type	3/4" drill capacity, 16" swing, 6 spindle	1025.00
3-B-12" Floor Type	3/4" drill capacity, 24" swing, 1 spindle	208.00
3-B-12" Floor Type	3/4" drill capacity, 24" swing, 2 spindle	378.00
3-B-12" Floor Type	3/4" drill capacity, 24" swing, 3 spindle	$ 588.00
3-B-12" Floor Type	3/4" drill capacity, 24" swing, 4 spindle	775.00
3-B-12" Floor Type	3/4" drill capacity, 24" swing, 6 spindle	1019.00
2-MS-12" Floor Type	3/4" drill capacity, 30" swing, 2 spindle	468.00
4-B-12" Floor Type	1" drill capacity, 24" swing, 1 spindle	293.00

CHECK THIS COMPLETE LIST

If tools of the type *you* need are included send today for WAA's catalog giving all sizes and models together with the fixed prices for purchases made anywhere in the U. S. Simply write, wire or phone the nearest WAA office listed on the 4th page of this advertisement.

- Boring Machine—Horizontal, Precision, Bridge Type, Single and Double End
- Chucking Machine—Automatic, Vertical, Multiple Spindle Type
- Chucking Machine—Single Spindle Automatic, Horizontal Turret Type Machine
- Chucking Machine—Six Spindle Automatic, Horizontal
- Drilling Machine or Drill Press—Bench or Floor, Single or Multiple Spindle
- Gear Cutting Machine for Straight Bevel Gears, (Not Planer Type)
- Gear Hobber—Horizontal
- Gear Hobber—Vertical, Universal
- Gear Shaper—For External Spur Gears Only
- Gear Shaper—For Spur Gears, External or Internal
- Gear Shaper—For Spur and Helical Gears, External and Internal
- Gear Tooth Shaver—For External and Internal Gears (Rotary Type Machine)
- Gear Tooth Grinder—Generating Type, for Spur and Helical Gears
- Gear Tooth Grinder—For Spur Gears, External and Internal (Formed Wheel Type Machine)
- Grinders—Centerless
- Grinder—Crank Pin Grinders
- Grinders—Plain External Cylindrical Grinder
- Grinder—Internal, Cylindrical, Automati Sizing
- Grinder—Internal Cylindrical (Hydraulic Feed Machine)
- Grinder—Internal Cylindrical, Hydrauli Feed, for Hole and Face Grinding.
- Grinder—Surface, Rotary Table Type
- Lathe—Multiple Tool, Not Automatic, Manufacturing Type Production Lath
- Milling Machine—Automatic and Manufacturing Knee Type
- Milling Machine—Plain Bed Type, Horizontal Spindle Machines
- Milling Machine—Vertical, Knee Type (Not Including Bench Type)
- Polishing and Buffing Machine—Bench an Floor
- Profiling Machine—Vertical, Fixed Bed Type, Single and Multiple Spindle
- Tapping Machine—Vertical, Single or Multiple Spindle
- Thread Grinding Machines
- Thread Milling Machine
- Turret Lathe—Ram Type, Plain and Universal

ALL TOOLS SUBJECT TO PRIOR SALE

Manufacturer: FOOTE-BURT COMPANY, CLEVELAND, OHIO

Mod. DE-1 Floor, Box Column	3/16" drill capacity, 14" swing, 1 spindle	$ 127.00
Mod. 2 Floor, Box Column	7/8" drill capacity, 16" swing, 1 spindle	147.00
Mod. 2 Floor, Box Column	7/8" drill capacity, 16" swing, 2 spindle	255.00
Mod. 2 Floor, Box Column	7/8" drill capacity, 16" swing, 6 spindle	$ 706.00
Mod. 2 Floor, Box Column	7/8" drill capacity, 24" swing, 1 spindle	156.00
Mod. 2 Floor, Box Column	7/8" drill capacity, 24" swing, 2 spindle	274.00
Mod. 2 Floor, Box Column	7/8" drill capacity, 24" swing, 3 spindle	$ 391.00
Mod. 2 Floor, Box Column	7/8" drill capacity, 24" swing, 4 spindle	510.00
Mod. 2 Floor, Box Column	7/8" drill capacity, 24" swing, 6 spindle	745.00
Mod. 3 Floor, Box Column	1-1/4" drill capacity, 24" swing, 1 spindle	$ 279.00

Manufacturer: THE FOSDICK MACHINE TOOL CO., CINCINNATI, OHIO

No. 4 Floor, Box Column	7/8" drill capacity, 24" swing, 1 spindle	$ 255.00
No. 4 Floor, Box Column	7/8" drill capacity, 24" swing, 3 spindle	601.00
No. 4 Floor, Box Column	7/8" drill capacity, 24" swing, 4 spindle	793.00
No. 4 B. M. Floor, Box Column	1" drill capacity, 16" swing, 1 spindle	$ 293.00
No. 4 B. M. Floor, Box Column	1" drill capacity, 16" swing, 2 spindle	293.00
No. 4 B. M. Floor, Box Column	1" drill capacity, 24" swing, 1 spindle	307.00
No. 4 B. M. Floor, Box Column	1" drill capacity, 24" swing, 4 spindle	1009.00
No. 5 B. M. Floor, Box Column	1-1/2" drill capacity, 24" swing, 1 spindle	$ 722.00
No. 5 B. M. Floor, Box Column	1-1/2" drill capacity, 24" swing, 2 spindle	790.00
No. 5 B. M. Floor, Box Column	1-1/2" drill capacity, 24" swing, 6 spindle	2219.00

IMMEDIATE DELIVERY bargains

25% (average) BELOW MARKET

Manufacturer: LELAND GIFFORD COMPANY, WORCESTER, MASS.

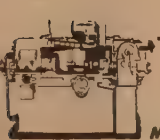
No. 1-LMS Floor, Motor Spindle	3/8" drill capacity, 12" swing, 1 spindle	$ 156.00
No. 1-LMS Floor, Motor Spindle	3/8" drill capacity, 12" swing, 2 spindle	274.00
No. 1-LMS Floor, Motor Spindle	3/8" drill capacity, 12" swing, 3 spindle	414.00
No. 1-LMS Bench, Motor Spindle	3/8" drill capacity, 20" swing, 1 spindle	147.00
No. 1-LMS Bench, Moter Spindle	3/8" drill capacity, 20" swing, 4 spindle	527.00
No. 1-LMS Floor, Motor Spindle	3/8" drill capacity, 20" swing, 1 spindle	168.00
No. 1-LMS Floor, Motor Spindle	3/8" drill capacity, 20" swing, 2 spindle	$ 308.00
No. 1-LMS Floor, Motor Spindle	3/8" drill capacity, 20" swing, 3 spindle	449.00
No. 2-LMS Floor, Motor Spindle	7/8" drill capacity, 14" swing, 1 spindle	275.00
No. 2-LMS Floor, Motor Spindle	7/8" drill capacity, 14" swing, 2 spindle	475.00
No. 2-LMS Floor, Motor Spindle	7/8" drill capacity, 14" swing, 3 spindle	691.00
No. 2-LMS Floor, Motor Spindle	7/8" drill capacity, 14" swing, 4 spindle	$ 907.00
No. 2-LMS Floor, Motor Spindle	7/8" drill capacity, 14" swing, 5 spindle	1109.00
No. 2-LMS Floor, Motor Spindle	7/8" drill capacity, 14" swing, 6 spindle	1312.00
No. 2-LMS Floor, Motor Spindle	7/8" drill capacity, 20" swing, 1 spindle	285.00
No. 2-LMS Floor, Motor Spindle	7/8" drill capacity, 20" swing, 2 spindle	491.00
No. 2-LMS Floor, Motor Spindle	7/8" drill capacity, 20" swing, 3 spindle	$ 714.00
No. 2-LMS Floor, Motor Spindle	7/8" drill capacity, 20" swing, 4 spindle	935.00
No. 2-LMS Floor, Motor Spindle	7/8" drill capacity, 20" swing, 6 spindle	1349.00
No. 2-LMS Floor, Motor Spindle	7/8" drill capacity, 26" swing, 1 spindle	297.00
No. 2-LMS Floor, Motor Spindle	7/8" drill capacity, 26" swing, 2 spindle	514.00
No. 2-LMS Floor, Motor Spindle	7/8" drill capacity, 26" swing, 3 spindle	$ 751.00
No. 2-LMS Floor, Motor Spindle	7/8" drill capacity, 26" swing, 4 spindle	984.00
No. 2-LMS Floor, Motor Spindle	7/8" drill capacity, 26" swing, 5 spindle	1206.00
No. 2-LMS Floor, Motor Spindle	7/8" drill capacity, 26" swing, 6 spindle	1426.00
No. 3-MS Floor, Motor Spindle	1" drill capacity, 24" swing, 1 spindle	$ 427.00
No. 3-MS Floor, Motor Spindle	1" drill capacity, 24" swing, 2 spindle	780.00
No. 3-MS Floor, Motor Spindle	1" drill capacity, 24" swing, 3 spindle	1154.00

Manufacturer: THE TAYLOR AND FENN COMPANY, HARTFORD, CONN.

Mod. S Floor, Box Column	3/8" drill capacity, 16" swing, 6 spindle	$ 477.00

Manufacturer: THE TOLEDO GENERAL MFG. CO., TOLEDO, OHIO

Model KTV Floor, Box Column	7/8" drill capacity, 24" swing, 4 spindle	$ 155.00



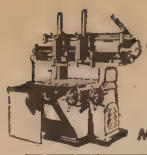
GRINDER — INTERNAL CYLINDRICAL, (HYDRAULIC FEED MACHINE)

Manufacturer: BRYANT CHUCKING GRINDER CO., SPRINGFIELD, VT.

MODEL AND DESCRIPTION	SIZE AND CAPACITY	SALES PRICE
Model 16-16 Internal Grinder, Hydraulic Feed	16" swing x 13" stroke	$1475.00
Model 16-22 Internal Grinder, Hydraulic Feed	22" swing x 13" stroke	1668.00
Model 16C-16 Internal Grinder, Hydraulic Feed	16" swing x 13" stroke	1647.00
Model 16F-28 Internal Grinder, Hydraulic Feed	28" swing x 13" stroke	$1766.00
Model 24-26 Internal Grinder, Hydraulic Feed	26" swing x 16" stroke	2051.00
Model 24-36 Internal Grinder, Hydraulic Feed	36" swing x 16" stroke	2427.00
Model 24L-26 Internal Grinder, Hydraulic Feed	26" swing x 24" stroke	$2589.00
Model 112M Internal Grinder, Hydraulic Feed	16" swing x 9" stroke	2292.00
Model 16-38 Internal Grinder, Gap Bed	38" swing x 9" stroke	1800.00

Manufacturer: THE HEALD MACHINE COMPANY, WORCESTER, MASS.

Model 81 Plain Chucker, Internal Grinder, Hydraulic Feed	9" swing x 3" stroke	$1122.00
Model 72-A-3 Plain Chucker, Internal Grinder, Hydraulic Feed	11-1/2" swing x 12" stroke	1327.00
Model 72-A-5 Plain Chucker, Internal Grinder, Hydraulic Feed	11-1/2" swing x 20-5/8" str.	1415.00
Model 74 Plain Chucker, Internal Grinder, Hydraulic Feed	24" swing x 15" stroke	$1940.00
Model 172, Gap, Plain, Internal Grinder, Hydraulic Feed	36" swing x 13" stroke	1778.00



PROFILING MACHINE — VERTICAL, FIXED BED TYPE, SINGLE AND MULTIPLE SPINDLE

Manufacturer: THE FREW MACHINE COMPANY, PHILADELPHIA, PA.

MODEL AND DESCRIPTION	SIZE	SALES PRICE
No. 6-A Single Spindle	24" x 36" table size	$ 793.00

Manufacturer: MOREY MACHINERY COMPANY, INC., NEW YORK, N. Y.

No. 12-M Single Spindle	23" table travel	$ 705.00
No. 12-M Two Spindle	23" table travel	742.00

Manufacturer: PRATT AND WHITNEY DIVISION, HARTFORD, CONN.

No. M-1693 Single Spindle, No. 12-B	20" table travel	$ 731.00
No. M-1693 Two Spindle, No. 12-B	20" table travel	844.00
No. M-1482 Single Spindle	32" table travel	1675.00

GEAR TOOTH GRINDER — GENERATING TYPE, FOR SPUR AND HELICAL GEARS

Manufacturer: THE FELLOWS GEAR SHAPER CO., SPRINGFIELD, VT.

MODEL AND DESCRIPTION	SIZE AND CAPACITY	SALES PRICE
No. 12 Spur and Helical, External only	12" pitch diameter x 1-1/2" face width	$ 1117.00

Manufacturer: PRATT AND WHITNEY DIVISION, HARTFORD, CONN.

M-1635 Spur	10- 1/4" pitch diameter x 6" face width	$ 1791.00
M-1639 Helical	10-11/16" pitch diameter x 6" face width	2528.00
M-1679 Helical, Two Wheel	10-11/16" pitch diameter x 1-1/4" face width	3300.00
M-1838 Helical	18- 1/2" pitch diameter x 6" face width	4292.00

GOVERNMENT WAA SURPLUS

Sales to priority claimants, which include Federal Agencies, Certified Veterans, World War II, and subsequent priority claimants, will be made in proper sequence as required by law.

Exporters: Your business is solicited. If sales are conducted at various levels, you will be considered as a wholesaler. Any inquiries regarding export control should be referred to Office of International Trade, Department of Commerce, Washington, D. C.

. . . and no priorities needed

To make purchases visit any of the W.A.A. offices listed below; your regular machine tool dealer, or any W.A.A. Machine Tool Site Sale advertised in your local paper. You can arrange on the spot for immediate purchase. Remember, however, that the particular machine you want may be located elsewhere and shipping times these days are still uncertain. But you will *not* have to wait for lengthy clearances of priorities on nation-wide search of stocks. The machines *are* available for immediate sale.

W.A.A. announced last month its important New Price Policy on 31 types of General Production Tools.

But just as a reminder here is how W.A.A.'s new price has been set for a typical machine; Model 2K Kearney and Trecker Milling Machine, vertical knee type; W.A.A. S.C. Code 3417-23-20-28.

Price (New)	$7,054.00
Previous W.A.A. Sales Price (based on depreciation primarily)	4,091.00
Average Market Value	2,556.00
New W.A.A. Sales Price	2,045.00
Available for rebuilding	511.00

GOVERNMENT W A A SURPLUS

THERE IS A
WAA REGIONAL OFFICE
NEAR YOU

(starred offices have the longest and most complete inventories of surplus machine tools—but stocks are extensive in *all* offices. Watch your newspaper for special machine tool sales in your area).

Offices located at:

Atlanta	Helena	Omaha
Birmingham	Houston	*PHILADELPHIA
*BOSTON	Jacksonville	Portland, Ore.
Charlotte	Kansas City, Mo.	Richmond
*CHICAGO	Little Rock	Salt Lake City
Cincinnati	Los Angeles	*ST. LOUIS
*CLEVELAND	Louisville	San Antonio
Dallas	Minneapolis	San Francisco
Denver	Nashville	Seattle
*DETROIT	New Orleans	Spokane
Fort Worth	*NEW YORK	Tulsa

MACHINE TOOL
SALES DIVISION

686-2

War Assets Administration

GOVERNMENT OWNED SURPLUS

(Continued from page 318)

that it fits readily between studs or joints. It is about 30" long and 9½" thick. The weight without cabinet is 45 lbs.; with cabinet, 70 lbs.

One man can easily handle the heater in making an installation. One man can easily remove it and replace it with another in case of service difficulty.

"It is obvious," Mr. Williams said, "that any heating device must be safe. The South Wind midget furnace not only has all the regulation safety devices and controls, but also additional safety factors. The American Gas Association has been conducting safety and performance tests on the midget furnace since last June. All of the safety and performance requirements have been met, and when the midget furnaces are produced, they will bear the famous AGA label. So far as we know, this is the first time that approval has been granted for the use of electric spark ignition (instead of the old pilot flame) in a device of this kind.

"The fire is completely sealed up, and it is fed with air from outside the house. It also discharges outside the house. Thus, there is a closed metal path from outside into the fire box and back outside again. This is positive protection against fire and also against the possibility of asphyxiation, because if the gas were to leak, it would go out into one of the connections outside, rather than into the room.

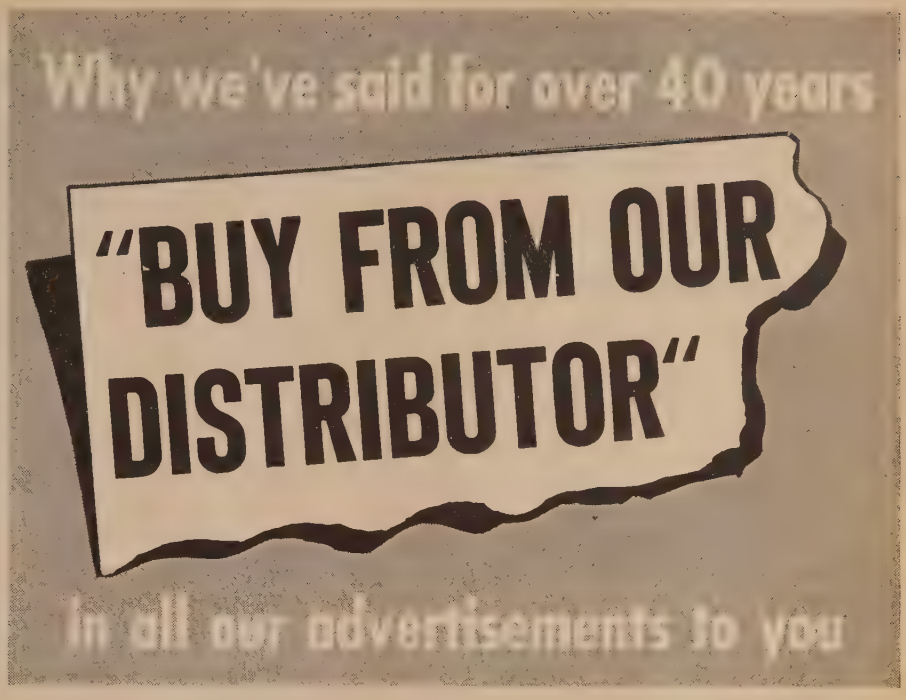
"This heater is built of stainless steel and we can use that material because, through the use of aircraft heating principles, we make the unit small enough so that the cost of stainless steel is not prohibitive."

● Flu-Preventive Shots Offered All Employes

Inoculation injections to prevent influenza have been offered all employes free of charge by the Kaydon Engineering Corporation, Muskegon, Mich. Kaydon is thought to be the first company to anticipate widespread sickness and to take immediate steps to prevent the spread of "flu" among its workers. Within four days after this modern medical treatment was offered, 80% of the company's workers had taken advantage of it. The preventive injections were used by the U. S. Army and proved effective in eight out of 10 cases.

According to A. Harold Frauenthal, chairman of the Board of the Kaydon Corp., these treatments were offered only after exhaustive

(Continued on page 320)



Since we started business in 1900, our policy of 100% cooperation with Distributors has been as much a part of us as our name and our products.

You as an industrial *user* benefit because the Distributor is far more than a mere middleman or broker. He is a "specialist's specialist" in supplying industrial tools and parts which lower your manufacturing costs.

Could you, alone, possibly keep abreast of ALL products and developments that save time . . . reduce production costs . . . increase manpower, tool and machine efficiency? Your Distributor does all this for you . . . and separates the chaff from the wheat in the doing.

Perhaps over the years you took your Distributors' services for granted —until war came—and scarcities. Then overnight you realized what a miracle he could perform in tapping sources countrywide to provide you with the "makings" for all-out production.

The Distributor performs many other services for you which if attempted by the manufacturer would be either entirely impractical commercially or would sky-rocket cost. These services include warehousing, selling, credit, delivery, quick, on-the-spot "trouble-shooting" when necessary, technical counsel from extensive and intensive knowledge of operating problems similar to yours.

Whether you call your Distributor "Bill", "Jim" or "Jones" — when you call *on* him—you receive the best there is in industrial supply and service! That's why we have always said—and will continue to say—"BUY FROM OUR DISTRIBUTOR".

American Swiss File & Tool Co., Elizabeth 1, N. J.

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SWISS PATTERN FILES

New Big Load Truck Rolls EASIER!

Rolls Easy as a BABY BUGGY!

1000 lb. cap.

ORDER MONDAY
GET IT FRIDAY
Immediate Shipment From Stock

$31.95 f.o.b.

Model **88R** All Purpose Big Load HANDEES Truck

- FOR SHOP, FOUNDRY, FACTORY
- FOR DOCK, WAREHOUSE, FREIGHT
- FOR APPLIANCES, FURNITURE, HEAVY BOXES OF PARTS, CARTONS, HIGH STACKS OF BOXES OR BAGS, REFRIGERATORS, STOVES, MACHINES

This new HANDEES Dual Wheel Truck was designed especially for heavy bulky loads. Rated at 1000 lbs., but will stand 200 lbs. overloading easily on fairly even floors.

Purpose No. 1—to make easier the handling of large heavy appliances, refrigerators, machines and other products.

Purpose No. 2—to handle large crates, or stacks of cartons, trays, boxes of parts, bales and the like. Many trucks will not satisfactorily handle such a wide variety of loads.

Dual Wheel Advantages: Gives a more solid footing, making it easier to "break-over" the load, and far easier to get rolling. Strain on arms is reduced where uneven floors are encountered, for there is considerably less side-wrench with 4 wheels than with 2 wheels. It is almost impossible to side-tip this truck no matter how far the load extends beyond the width of the truck because of the extra stability gained by the 4 wheels.

Quiet, Resilient Tires will not mar, scratch or track your floors. They roll easily over uneven floors or over small obstacles found on many floors, without the sudden "slewing" around experienced with smaller or single wheels when you run into some small object. Four 8" x 2" rubber wheels of exceptional durability, with famous Chrysler Oilite bearings.

Light Strong Frame of 1" O.D. tubular steel, all welded construction gives strength without useless weight. The only thing really heavy is the 24" nose piece made of quarter-inch steel armor plate. Yet the entire truck weighs only 51 lbs. Height of truck, 54"; width 24". Curved cross straps. 13' web strap, with buckle.

Try This Truck. You will find HANDEES Dual Wheel Trucks will greatly reduce the job of handling big heavy loads, yet it isn't too much truck to wheel around when you have a light load. The dual wheels answer the same problem here as in the automotive truck industry.

Try at our Risk. Over 10,000 HANDEES trucks have been sold by mail. Less than a dozen of them have come back on our simple guarantee, "Send back any HANDEES truck collect if it doesn't fit your needs." Order by mail with full confidence of satisfaction or your money back.

Delivery: Order Monday—get Friday. Immediate delivery from stock.

Terms: 1% 10 days. Unrated firms, cash.

ORDER FROM **HANDEES COMPANY**
Dept. MF 1 **Bloomington, Illinois**

(Continued from page 319)

investigation and upon recommendations of competent medical doctors. The injections were administered by a physician in the company hospital. Results are being observed carefully by the company's registered nurse. Mr. Frauenthal added that this medical service was offered in the best interests of the workers, as well as to reduce time lost from work.

Observation of employes treated for inoculation against influenza show that about 66% experienced no reaction from the shots. Approjimately 16% reported slight head or backaches. Less than 1% experienced chills or headaches lasting about eight hours. These are considered "normal expectancy" in such inoculation. There was no lost time from work as the result of the treatments. The anti-flu serum gives protection from influenza for several months.

● Seiberling Anniversary

F. A. Seiberling, right, receives honors from son, J. P. Seiberling, left.

Seiberling Rubber Co., Akron, Ohio, was 25 years old in November, and F. A. Seiberling, its 87-year-old chairman, who started all over again at an age when most men are ready to retire, received honors as its founder and charter member of the company's new 25 year club.

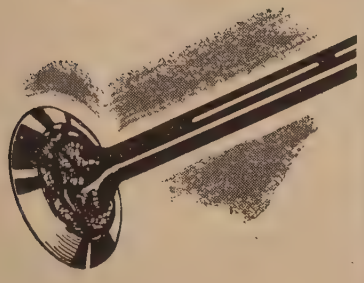
The award was made as part of the silver anniversary celebration, which included a banquet honoring 25-year employes and an elaborate musical pageant, "Something Accomplished," which depicted the company's quarter-century history.

Mr. Seiberling's award was presented by his son, J. P. Seiberling, who succeeded him as president of the company in 1938. Fifty-two other 25-year-members were also honored, and received silver plaques, checks for $250 each, and an extra two weeks' vacation with pay.

(Continued on page 322)

LONGER LIFE FOR NEW AND WORN PARTS

FROM EXHAUST VALVES TO DRILLING BITS . . .



Exhaust Valves

Bulldozer Tips

Conveyor Screws

Clam Shells

Roll Crusher Teeth

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Drilling Bits

BY HARD-FACING WITH STOODY ALLOYS

Whatever your problem — heat, corrosion, impact or abrasion — Stoody hard-facing alloys will give you the most effective solution. With one application of these wear-retarding materials the service life of both new and worn parts is increased many times. Listed below are some of the most widely used Stoody alloys.

For further details *write for Catalog No. 40* — Air Reduction, General Offices, 60 East 42nd Street, New York 17, N. Y. In Texas: Magnolia Airco Gas Products Company, General Offices, Houston 1, Texas. Represented Internationally by Airco Export Corporation.

1—STOODITE. A cast alloy rod recommended for application where wear resistance is particularly important. Deposit tends to polish under abrasion. Applied electrically or by gas process. Deposits test from 54 to 58 on Rockwell "C" scale.

2—STOODY SELF-HARDENING RODS. A rod fabricated of steel strip and carefully selected alloys. Suitable for electric or gas application. Good wear resistance and high impact strength in relation to hardness. Forms excellent bond with manganese steel. Particularly useful for hard facing excavating equipment. Can be forged without loss of hardness. Deposits test from 52 to 54 on Rockwell "C" scale.

3—STOODY No. 1. A non-ferrous, hard-facing alloy consisting of cobalt, chromium and tungsten . . . excellent corrosion resistance . . . retains hardness and wear resistance even at red heat . . . cold hardness of 53 to 55 on Rockwell "C" scale. May be used wherever heat, abrasion and corrosion are involved. While recommended for application by gas process, rods suitable for electric application are available. Rockwell "C" hardness A.C., D.C.: 46 to 50.

4—STOODY No. 6. Excellent corrosion resistance . . . high impact and good wear resistance with some degree of ductility . . . retains hardness and wear resistance at red heat . . . cold hardness of 42 to 44 Rockwell "C" Scale. May be used wherever heat, impact, abrasion and corrosion are involved. While recommended for application by gas process, rods suitable for A.C. or D.C. electric application are available.

5—TUBE BORIUM. A fabricated rod composed of particles of Borium and mild steel strip . . . forms an extremely hard surface, which is heterogeneous and will resist wear better than any other metal. Because of the great, almost diamond-like hardness of the Borium particles, this rod has highly efficient cutting qualities on the edges of rotary drilling bits, bean knives and the like . . . as well as being resistant to abrasion on scarifier teeth, grader blades and similar tools.

There are two types of Tube Borium, Acetylene Tube Borium, for oxyacetylene application only, and Electric Tube Borium for electric application only.

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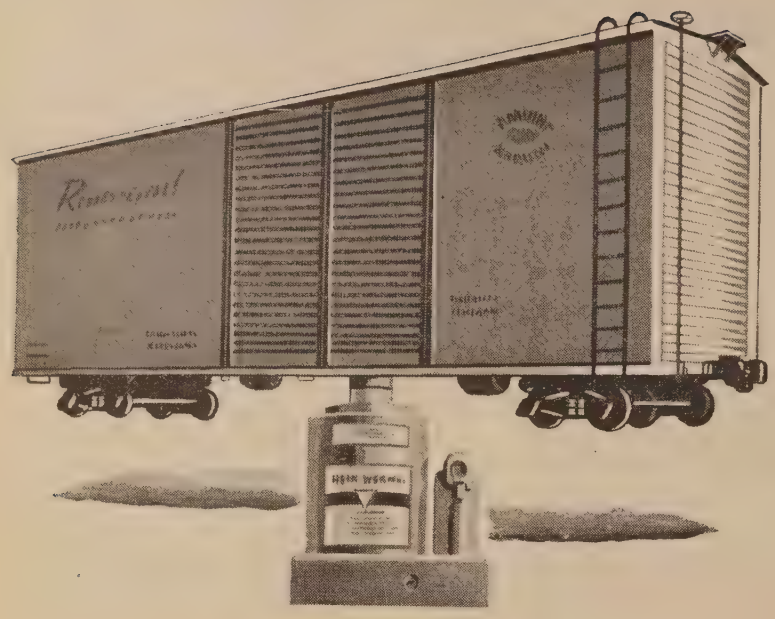
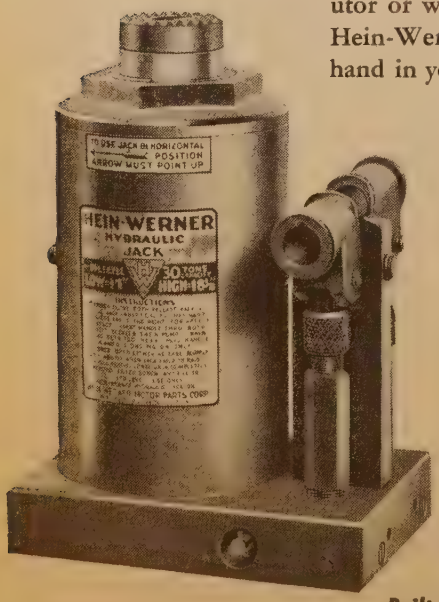


HOW MANY MEN WOULD IT TAKE TO LIFT 100,000 LBS?

Of course it would depend on the size of the men—and whether it was before or after lunch. But our point is that no matter how many men it would take, ONE Hein-Werner Hydraulic Jack could lift it easier, faster and safer—anytime!

And the same goes for a thousand and one other applications in your plant—pushing, bending, pressing... in plant production and plant maintenance. H-W Jacks are factory-tested at 1½ times their rated capacity for absolute dependability and safety.

See your nearest industrial supply distributor or write us for details on the ways a Hein-Werner Hydraulic Jack can lend a hand in your plant.



- Lifts Heavy Loads
- Moves Machinery
- Bends Rods
- Presses Bushings
- Many Other Uses

Made in models of 3, 5, 8, 12, 20, 30 and 50 tons capacity.

Hein-Werner HYDRAULIC JACKS

Built Right • Priced Right

HEIN-WERNER MOTOR PARTS CORP. • Waukesha, Wisconsin

(Continued from page 320)

The banquet was held at Hotel Mayflower, Akron, with 25-year members sitting at places of honor, with most of their wives in the audience. At F. A. Seiberling's left was his first employe, Anna Johnson, who has been his secretary continuously since 1912, when she joined him at Goodyear Tire & Rubber Co.

Charles A. Reed, now assistant to to the president and the only other employe still with the company who was with Mr. Seiberling on the founding day, sat on his right.

• Mechanical Car Washer

A new, revolutionary mechanical automobile washer that can wash, polish and dry a car in a minute and which requires only three attendants for its operation, is now being manufactured by the Minit-Man Car Washer Div., 7450 Melville at Green, Detroit, Mich.

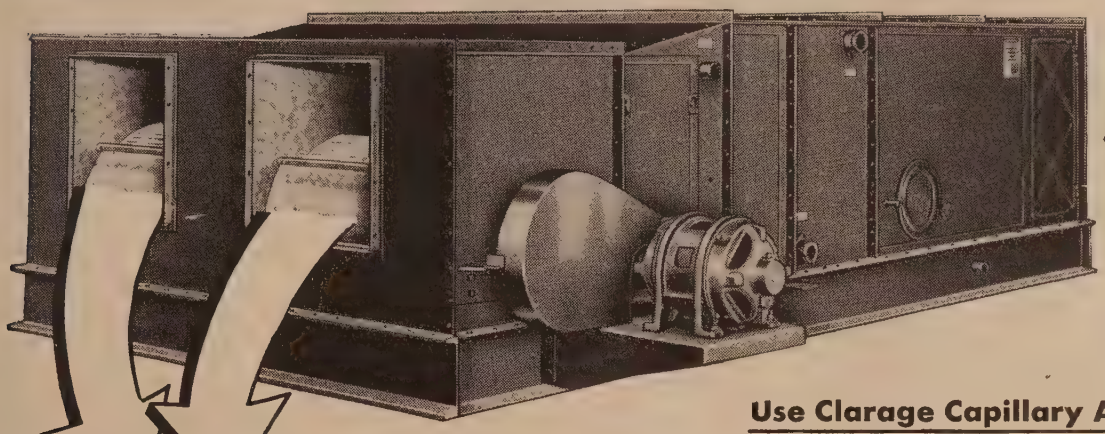
Said to be the first time since the invention of the automobile itself that a mechanical automobile washer has been put into successful operation, the new machine, known as the "Minit-Man Automatic Car Washer" washes not only automobiles and taxicabs, but panel delivery trucks and similar vehicles.

The machine consists essentially of two units; a washer and drier. The washer employs a series of brushes (on which water is sprayed) that revolve continuously and are brought to bear against the front, top, sides and rear of the car to completely remove all of the rust and dirt from the exterior of the car. The drier directs a series of air currents at the car which remove all of the water in such a way that there are no streaks or spots left and the appearance of the finished surface is said to be that of a car that has been completely and carefully hand wiped.

The new machine, which was designed and is built in Detroit, employs typical automobile production line methods to produce the speed that is said to be at least 10 times

(Continued on page 324)

WHEN YOUR PLANT AIR GOES IN HERE



Illustrated is a No. 34H3 Capillary Unit Conditioner with cooling and heating coils, providing complete air conditioning in one assembly.

It Comes Out Here
CLEAN and COOLED
HUMIDIFIED or DEHUMIDIFIED

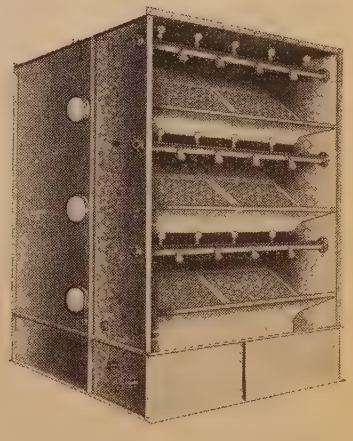
Use Clarage Capillary Air Conditioning Units where Accurate Control of Temperature and Humidity is Important — and where Maximum Air Cleanliness is Vital to Production, Uniform Quality of Product, Health or Safety.

Clarage Capillary Air Conditioners are complete factory assembled units, including a Capillary cleaning section, pump, heating coils, fan, drive and motor. They are available in seven sizes — 1800 to 20,000 c.f.m. Horizontal units, as shown above, are built in both Class I (con-current) and Class II (counter-current) types. Vertical units in Class II arrangement only.

There are excellent reasons for considering this modern air conditioning equipment: (1) Inexpensive to install — no costly building alterations required; (2) Everything in one "package" — no parts to assemble on the job; (3) Proper coordination and performance of all parts assured by factory tests; (4) Low first cost and low operating costs—the result of shrewd, advanced engineering.

★ ★ ★

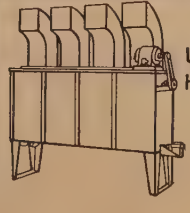
Write for our Bulletin 122. It gives complete information.



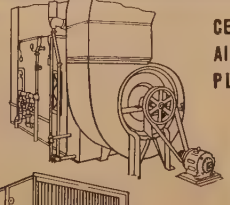
CAPILLARY AIR WASHERS

are available in a series of five height sizes, and in eleven widths — capacities from 4,400 to 132,000 c.f.m. They are built in Class I (con-current), Class II (counter-current) and Class III (con-current with coils) types. Bulletin 120 describes complete line of equipment.

SOME OF OUR OTHER PRODUCTS

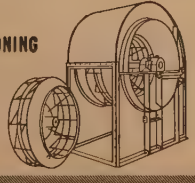


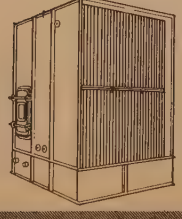
UNIT HEATERS



CENTRAL STATION AIR CONDITIONING PLANTS

AIR CONDITIONING AND VENTILATING FANS





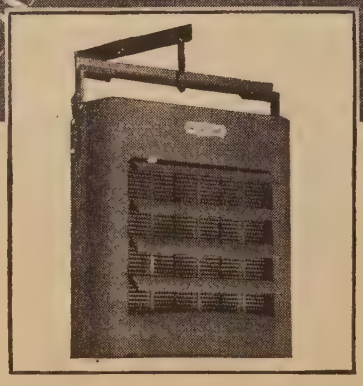
AIR WASHERS

CLARAGE
FAN COMPANY
Kalamazoo, Michigan

APPLICATION ENGINEERING OFFICES IN ALL PRINCIPAL CITIES

A COOL ELEMENT FOR HOT AIR

Electromode Element Gives Off Heat So Fast It Stays Relatively Cool



The 10 KW model illustrated is for suspension mounting only. Other models 1.5 KW to 7.5 KW arranged for either portable use or suspension mounting.

This unusual patented heating element is the core of all Electromode Heaters and is the same as that used on Electromodes installed for the heating of U. S. Submarines. The insulated resistor is sheathed and then permanently embedded in a one-piece finned aluminum casting.

Aluminum is used for its high thermal conductivity and the fins of the casting provide a great area of radiating surface. Consequently the heat is conducted away so rapidly that Electromode Unit Heaters have exceptional B.T.U. output at a safe, low operating temperature. The warmed air is circulated by a motor-driven fan and distributed by adjustable deflectors at the proper degree of temperature to create uniform heat conditions throughout the room.

Electromode Heaters may be installed wherever circuit wires can be run. Heat is available instantly and *all* electrical energy is converted 100% into heat.

With no piping or piping connections, no maintenance problems, and no current loss when not "on", Electromode Unit Heater efficiency is high and satisfaction is just as lasting as the long-life rugged construction. ELECTROMODE CORPORATION, 87-1 Crouch St., Rochester 3, New York.

New illustrated Bulletin 45-U just released. Available upon request. Write for a copy today.

ELECTROMODE
Electric Unit Heaters

(Continued from page 322)

faster than the average for the so-called "rapid" auto wash.

The cycle begins with the vacuuming of the interior of the car which is usually done by the operator of the machine. The operator than attaches to the front bumper a chain which, connected to the conveyor cable, moves the automobile into and through the washing and drying cycles.

As the car enters the washing stage, the operator manipulates the brushes so that a horizontal brush will, while continuously rotating, traverse the front, the hood, the windshield, the top and the rear of the car. Simultaneously, other brushes also revolving and being sprayed with water, are brought into contact with the sides of the car and with the wheels.

Belt Spins Wheels

A short, endless belt on either side of the path of the car serves to spin the wheels as the wheel brushes are brought into contact with the wheels thus insuring a complete washing of the exposed area of the wheel.

Air for the drying cycle is supplied by a motor driven blower mounted above the washer. The air does not even require heating; it is simply recirculated being taken from the interior of the building.

When the car has left the drier, an unlocking trigger disconnects the tow chain from the conveyor cable, the interior of the car receives a final wiping and the car is delivered washed, polished and dried.

The floor area required for the unit, including that needed for the conveyor cable, is 12 x 74 feet. The additional space at each end of the machine and that required for normal handling of business indicates floor space requirements of approximately 20 x 100 feet.

Cost of operating the machine aside from the labor, consists principally of electricity and water which amount to a total of something less than 6c per wash in the Detroit area.

• Company Changes Name

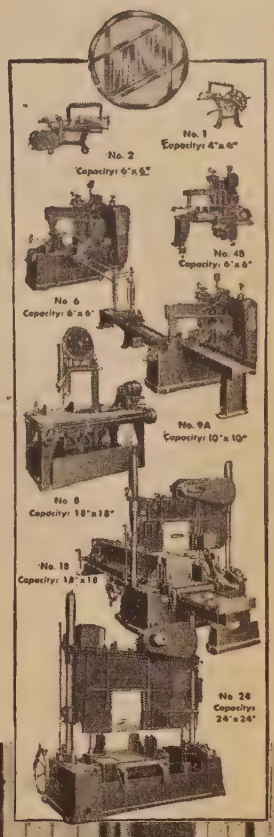
The name of the 38-year old American Foundry Equipment Co., of Mishawaka, Ind., has been changed to American Wheelabrator & Equipment Corp., according to an announcement made by Otto A. Pfaff, president. The new name is more appropriate, Mr. Pfaff pointed out, because one of the principal

(Continued on page 326)

MARVEL No. 8 Band Saws are used

Not only in all Latrobe warehouses but at the mill too, MARVEL No. 8 metal-cutting Band Saws are used to cut expensive Tool and Alloy Steels accurately to specification. There are many reasons why the Latrobe Electric Steel Co. has standardized on the universal MARVEL No. 8. It is the most universal saw built—will cut the smallest pieces as well as the largest work up to 18" x 18" with equal accuracy, will cut at any angle, etc. . . . and, is easily operated and practically trouble-proof.

There is a MARVEL Saw for every need and budget. A local MARVEL Field Engineer will gladly discuss your problem with you, recommend the most suitable saw and demonstrate a MARVEL Saw in your vicinity. Consult your classified phone book or write us for address of nearest MARVEL Field Engineer.



ARMSTRONG-BLUM MFG. CO.

"The Hack Saw People"

5700 Bloomingdale Ave. Chicago 39, U.S.A.

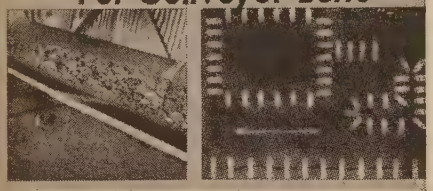
Eastern Sales Office: 225 Lafayette St., New York 12, N. Y.

MARVEL SAWS

Present Day Practice in Belt Fastening

Every man who has anything to do with the purchase, application or maintenance of conveyor, transmission or V-belts will find the bulletins listed below of considerable value in connection with belt fastening work. A knowledge of present day practice in belt fastening helps reduce the loss in machine hours due to belt failures caused by the use of the wrong type of fastener or improper application. We shall be glad to send any or all of them to you or to any of the men in your organization.

For Conveyor Belts



FLEXCO HD Belt Fasteners are used to make a "water-tight" butt joint in conveyor belts ranging from ¼" to 1½" thick and of any width. The view on the right shows the various types of rips and patches that can be made with these fasteners and Flexco HD Rip Plates.

Bulletin F-100 gives complete details on how to fasten and repair conveyor belts.

For V-Belts

ALLIGATOR V-Belt Fasteners are now being widely used to fasten B, C and D, open-end V-belting of cross woven fabric core construction now being made by most belting manufacturers. The view at the left shows a typical application of these fasteners to a drive where endless V-belts would require dismantling the machinery to put the belts on the sheaves.

Bulletin V-205 gives complete instructions on how to use V-belt fasteners.

FLEX V Fasteners for A and B belts are also available for lighter duty V-belt drives. Ask for **Bulletin V-14.**

For Transmission Belts

ALLIGATOR Steel Belt Lacing is in world-wide use to make smooth, flexible joints in leather, rubber, balata, stitched canvas or solid woven belts up to ⅜" thick and as wide as they come.

Bulletin A-60 tells how to fasten and repair transmission belts.

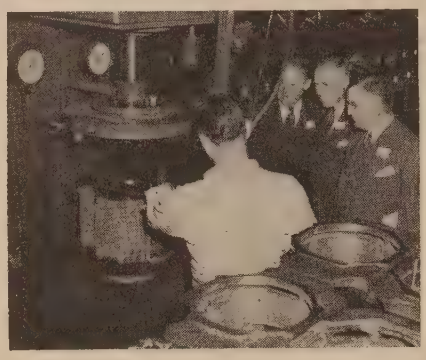
Sold by Supply Houses Everywhere

FLEXIBLE STEEL LACING COMPANY
4611 Lexington Street, Chicago 44, Ill.

(Continued from page 324)

products of the company is the Wheelabrator, developed by the company and used for cleaning and finishing metal products in many fields.

● Service Record of Bearing



Watching a journal box undergo a porosity test under the trained eyes of a SKF worker are, left to right, Percy Keller, assistant general sales manager of The Budd Co.; R. P. Johnson, vice president of Baldwin Locomotive Works, and A. W. Holbrook, Philadelphia representative of American Car Foundry Co.

An unusual record of service for anti-friction bearing equipment has been revealed by SKF Industries, Inc., for the first spherical roller bearings ever used by American industry.

Now widely applied to heavy equipment in all industries, the spherical roller bearing was introduced in 1921 by the Philadelphia ball and roller bearing company with installations on six Pennsylvania Railroad passenger cars. All of the bearings were designed for high load capacity and long life.

Of the 52 original bearings, 17

(Continued on page 328)

LINES WANTED

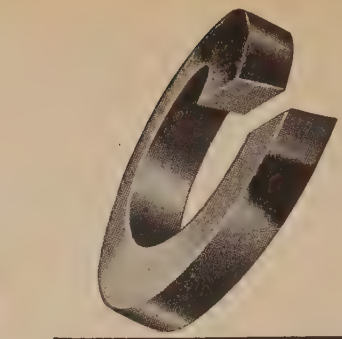
Manufacturers' agents with headquarters in Akron, Ohio, with salesmen operating in every industrial and jobbing center in Northern Ohio, Western Pennsylvania and Northeastern Indiana, desire additional lines of mechanical equipment and steam specialties, whose producers can effect prompt deliveries.

Salesmen involved have had many years of sales and purchasing experience, are well-acquainted with, and received by, purchasing and engineering personnel, and are in a position, through established outlets, to most capably represent well-rated and recognized manufacturers of quality products.

This agent is not interested in acquiring "off-brand" or cut-price lines. Address Box 357, MILL & FACTORY, 205 E. 42nd St., N. Y. 17, N. Y.

STEEL BALLS WANTED

¼" and ⅜" Diameter hardened Steel balls. Advise price, quantity, grade, and availability. Write Box 358, MILL & FACTORY, 205 E. 42nd St., N. Y. 17, N. Y.



BEALL
Spring WASHERS

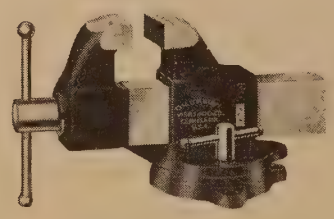
Bolted assemblies stay TIGHT permanently

BEALL SPRING WASHERS, with live, long-range action compensate for ALL causes of looseness including vibration, bolt stretch, wear, rust and break-down of finish under the nut and bolt head.

IN STOCK in all Standard Sizes; made of Carbon Steel, Stainless Steel, Everdur and Duronze.

BEALL TOOL DIVISION (HUBBARD & CO.)
120 Shamrock St. EAST ALTON, ILL.

COLUMBIAN VISES



Columbian Vises give better service longer. They are the means of producing bench work better, quicker and more economically. Columbian Vises are designed to assure additional working strength, positive gripping efficiency and easier operation.

Your Columbian Distributor is always ready to help you.

• STRENGTH • WORKMANSHIP
• ACCURACY • DEPENDABILITY

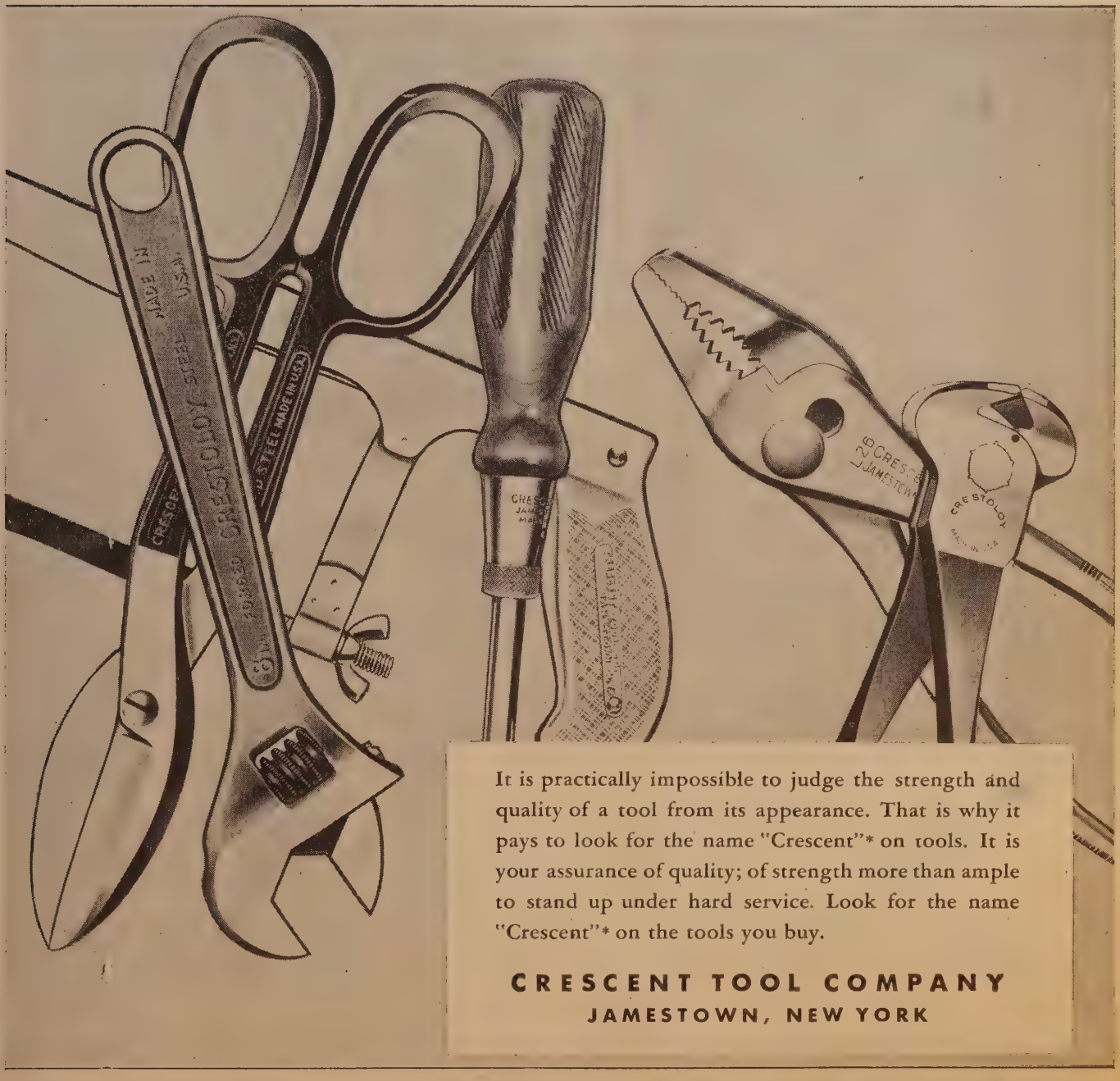
THE COLUMBIAN VISE & MFG. CO.
9024 Bessemer Ave., Cleveland 4, O.

The World's Largest Makers of Vises

When you buy Tools—

be sure to spot the important point

*It's the name "CRESCENT"**



It is practically impossible to judge the strength and quality of a tool from its appearance. That is why it pays to look for the name "Crescent"* on tools. It is your assurance of quality; of strength more than ample to stand up under hard service. Look for the name "Crescent"* on the tools you buy.

CRESCENT TOOL COMPANY
JAMESTOWN, NEW YORK

*"CRESCENT" is our trade mark in the United States and foreign countries for wrenches and other tools. "Crescent" tools are made only by Crescent Tool Company of Jamestown, N. Y.

Full choke or open bore?

An expert marksman selects his gun carefully—he knows the importance of using the right weapon for the job. Whether it's bringing down targets or bringing down costs, correct tools are of prime importance. E-Z Sort Systems provide fast, efficient channeling of data that enables you to assemble ALL the cost elements in any operation. The result—speedier, more accurate cost distribution and analysis.

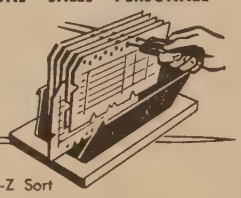
YOU CAN'T CUT PRODUCTION COSTS WITHOUT COMPLETE KNOWLEDGE OF THEIR ELEMENTS

Get the facts—then act! Vital information at your fingertips in seconds with E-Z Sort Systems. This unique primary record and media gives you the right facts, names, accounts or analysis instantly—enabling you to control . . . expedite . . . simplify! Complete and economical . . . E-Z Sort Systems can be applied to YOUR cost and production problems.

COSTS & PRODUCTION CONTROL • INVENTORY • PAYROLL • OPERATIONS • SALES • PERSONNEL

Offices in Principal Cities

E-Z SORT EQUIPMENT — E-Z SORT SYSTEMS



If "Information" cannot give you the telephone number of E-Z Sort Systems or Business Controls Service in your city, phone, wire or write

• L. M. OSBORNE COMPANY • *National Distributors*

45 Second Street • Telephone DOuglas 5150 • San Francisco 5, California

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Only SpeedLIFT GIVES YOU

DECREASED HANDLING COST!

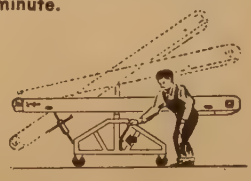
Speedlift Endless Belt Conveyor loads, unloads, elevates, stacks—speeds up material handling in warehouses, loading platforms, freight yards, etc. Cuts handling costs and man hours. Speedlift is sturdy—it has an all-welded structural steel frame—one piece formed frame construction!

INSTANT, REVERSIBLE CONTROL!

Conveniently located START-N-STOP switches at either end of SPEEDLIFT (one reversible) mean controlled material flow at all times in EITHER direction. Just flip the REVERSING SWITCH—Move a distributed load of 250 pounds in horizontal position—or 150 pounds up to 35°—at a speed of 50 feet per minute.

QUIET, SIMPLE AND EASY TO OPERATE!

Four 6" diameter RUBBER-TIRE casters—two swivel type, two stationary—permit ease of handling. One man easily moves SPEEDLIFT into tight places and confined areas. HYDRAULIC JACK adjusts SPEEDLIFT to any height and angle from horizontal to 35°.



KEEP 'EM ROLLING WITH SPEEDWAYS CONVEYORS, INC.

1292 Niagara St. Buffalo 13, N. Y.

Represented by experienced Material Handling Equipment Engineers in principal cities.

See the new SPEEDLIFT at Booth #407 at the "Material Handling Exposition" in Cleveland — Jan. 14-17th.

(Continued from page 326)

still were in operation, all with 2,400,000 miles or more of service, when the railroad removed them recently because of obsolescence of the truck assemblies.

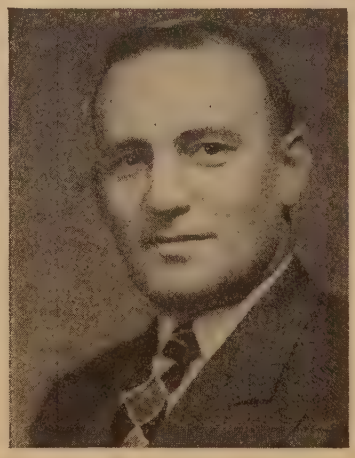
One of the bearings, with 2,879,000 miles of service, was a feature of an exhibit staged by SKF during the observance October 22 and 23 of the company's 25 years of service to the railroad industry.

Representatives of leading Eastern railroads, carbuilders and railway equipment supply companies joined with SKF in marking the event which was highlighted by a tour of the company's two plants and the Philadelphia Naval Base.

Facilities for the manufacture of spherical roller bearings, in continuously increasing demand, and for production of railway journal boxes were inspected by the visitors.

SKF's journal box production line, newest installation for manufacture of this type of equipment, is the company's first postwar expansion project. The U-shaped line utilizes assembly line techniques and automatic handling devices that reduce costs below those of old job shop methods.

● Goes To Java



Louis D. Hochberg, prewar superintendent of Goodyear Tire & Rubber Company's factory in Buitenzorg, Java, left Akron, Ohio, Nov. 4 on an inspection tour of Goodyear holdings in the Far East. This is his second trip to Java since the war ended.

Mr. Hochberg was forced to flee Java by the invading Japanese early in 1942. Returning immediately after VJ-Day, he found the Goodyear factory still intact. It had been operated by the Japanese during the war, but is now idle. Opened in 1935, the Goodyear-Java factory is the only tire plant in the Netherlands Indies.

Traveling to Java by plane, Hochberg planned to stop enroute to visit the Goodyear plant in Sydney, Australia.

● 5 Lb. Fire Extinguisher

A new model fire extinguisher containing 5 lbs. of fire-killing carbon dioxide in a recently developed light-weight cylinder is under production by Walter Kidde & Co., Inc., Belleville, N. J. The new portable replaces the old 4 lb. type, giving an extra pound of carbon dioxide while knocking 2½ lbs. off the average charged weight. The 4 lb. portable weighed 18 lbs. whereas the new 5 lb. model weighs but 15½ lbs.

Increased carbon dioxide content in the new model provides added protection to small hazard areas. With the extra pound of carbon dioxide, fires can be attacked with a greater safety factor. Easier handling has been made possible by the reduction in weight.

Other portables are available in 2½, 10, 15 and 20 lb. sizes; and wheeled units in 50, 75 and 100 lb. sizes. All sizes of Kidde extinguishers are approved by both the Underwriters' and Factory Mutual Laboratories for flammable liquid and electrical fires.

● Company's Service Policy

Believing that the best public relations tool a manufacturer, distributor or dealer can have is quick, competent and economical repair service on the products it sells, The Proctor Electric Co., Philadelphia, Pa., has taken steps to insure such a program.

Coming at a time when emphasis is upon getting merchandise into the retailer's hands and not upon the customer's rights to the service and use of an appliance after purchase, the service policy is not only a guarantee to the consumer that he or she is purchasing a first-grade product, but also guarantees the retailer free-

(Continued on page 330)

"If a fire starts here, a built-in extinguishing system is your best bet"

Have you a fire hazard involving storage of flammable liquids—paints, solvents, oils?

You'll find it worthwhile to talk it over with a Kidde representative!

He's an old hand at fire protection problems. He can study your specific hazard, and suggest the type of extinguishing equipment best suited to your needs—built-in systems, wheeled units, portables.

All types of *Kidde* carbon dioxide extinguishing equipment, of course, offer the same basic advantages. Fast, sure action against fires in flammable liquids and electrical apparatus. No corrosion of metals, no contamination or dilution of liquids. No after-fire mess. Carbon dioxide is deadly to fire—harmless to everything else!

Walter Kidde & Company, Inc., 140 Main Street, Belleville 9, N. J.

The word "Kidde" and the Kidde seal are trade-marks of Walter Kidde & Company, Inc.

Kidde

FIRE PROTECTION HEADQUARTERS

For Grinding and Cutting

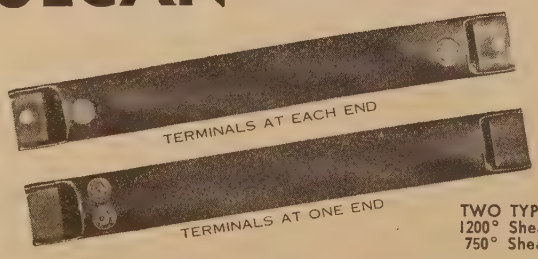
ECONOMY
THE W&B CO.
LUBRICANT
1888

The unusual detergency of ECONOMY LUBRICANT 1888 keeps grinding wheels open and free cutting—thereby permitting the use of finer wheels where desired to obtain better finish—less wheel dressing is required—production is increased.

ECONOMY LUBRICANT 1888 is a stable product . . . stands up under shipment in cold weather . . . is pleasant to work with and not irritating to the skin.

THE WHITE & BAGLEY COMPANY
WORCESTER 8, MASS., U.S.A.
Original Producers of Grinding Lubricant

VULCAN



FLAT HEATING UNITS

1. Seamless.
2. Single or Three-heat.
3. Standard widths—¾", 1", 1½".
4. Practically any length up to 120".
5. With or without mounting holes.
6. Special shapes for unusual applications.

TRADE VULCAN MARK

We take particular delight in solving problems involving Electric Heat.

VULCAN ELECTRIC COMPANY
DANVERS 4, MASS.

Makers of a wide variety of heating Elements for assembly into manufacturers' own products and of Heating Specialties that use electricity.

(Continued from page 329)

dom from service headaches and reduced profits caused by the repeated handling of repairs for which he can expect no remuneration, but which he must do as customer accommodation.

This policy is being carried out by 161 authorized franchised service stations throughout the country, each of which has been chosen to serve a major marketing area and functions under direct Proctor factory supervision.

The company has printed a booklet on its "customer satisfaction" service policy and in it explains every possible phase of Proctor service, telling what the customer can expect in the way of guarantees, parts replacement, and repairs both within and without the one year guarantee period. Printing of a booklet on a service policy is said to be the first time that such a policy has been enunciated, printed and widely distributed by an electrical appliance manufacturer.

Rights of service stations have not been overlooked. They are assured a definite marketing area from which to draw and orders for

A CENTERED EYE IN 1 OPERATION

Precision CENTERED EYE Bending With DI-ACRO BENDERS

The DI-ACRO Bender makes perfectly centered eyes from rod or strip stock at high hourly production rates. Both eyes and centering bend are formed with one operation. Any size eye may be formed within capacity of bender and ductile limits of material.

DI-ACRO Precision Bending is accurate to .001" for duplicated parts. DI-ACRO Benders bend angle, channel, rod, tubing, wire, moulding, strip stock, etc. Machines are easily adjustable for simple, compound and reverse bends of varying radii.

Send for Catalog "DIE-LESS" DUPLICATING showing many kinds of "die-less" duplicating produced with DI-ACRO Benders, Brakes and Shears.

Pronounced→ "DIE-ACK-RO"

O'NEIL-IRWIN MFG. CO.
356 Eighth Avenue, Lake City, Minnesota

parts received at the factory will be forwarded to the local service station. Factory training for service station personnel is available for a 2-week period without charge.

● Technical Center Staff

N. J. Davidson

Nucleus of a general administrative staff for the projected General Motors Technical Center in Detroit, Mich., has been announced by C. L. McCuen, vice president in charge of the GM central engineering staff. Heading the list of appointments is W. J. Davidson, who has been associated with the project since its inception and who will be administrative engineer, aided by Col. A. J. Schamehorn as assistant administrative engineer.

Messrs. Davidson and Schamehorn continue as members of Mr. McCuen's staff and will have supervision over the construction, equipment and maintenance of the Technical Center. They will make their headquarters at the new center when it is completed.

Mr. McCuen also announced the appointment of Lyle A. Walsh as manager of operations, advanced engineering section.

The direction of the advanced engineering section will be carried on under Mr. McCuen when the center is completed, while the operation of buildings housing the research laboratories, process development and styling sections will be the responsibility, respectively, of Vice Presidents C. F. Kettering, B. D. Kunkle and H. J. Earl.

Mr. Davidson joined General Motors in 1914 as junior engineer with Cadillac Motor Division. He left Cadillac from 1917 to 1919 to serve as captain in the Motor Transport Corps, U. S. Army. Upon his return he became associated with General Motors' Canadian operations and was named chief engineer of GM of Canada in 1922.

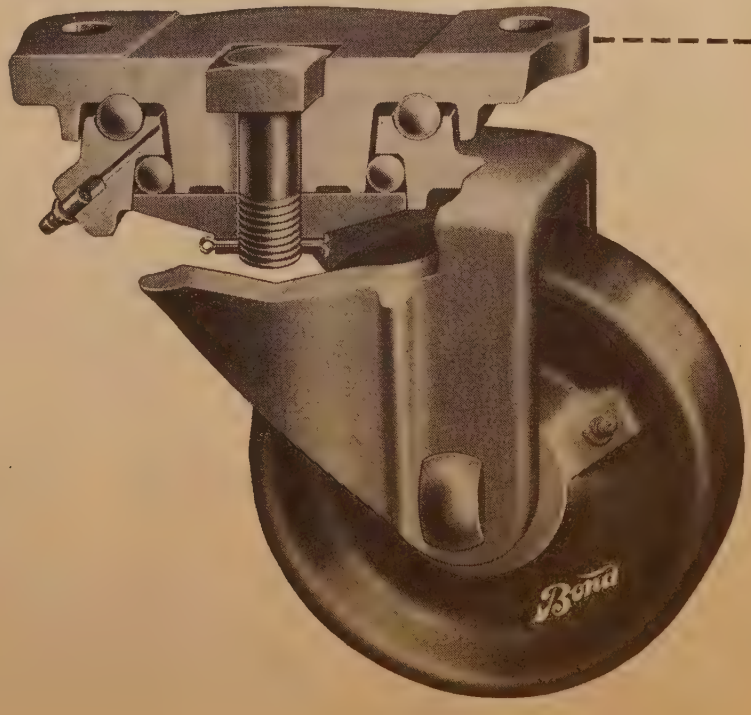
HERE'S THE Bond CASTER
REG. U.S. PAT. OFF.
THAT "CUTS CORNERS"
TO CUT YOUR COSTS

EASY swiveling Bond 136-A casters permit trucks to be turned in minimum space . . . eliminate waste motion. Sturdy, built of durable Bond caster metal, they are designed to roll up long service records.

How much service a caster will render—how efficiently it will perform—depends on its suitability for actual operating conditions. Are your casters precisely right? Rely on the considered judgment of Bond engineers. Recommendations are always impartial because there is a Bond caster for every industrial purpose. Write for catalog K-36.

BOND FOUNDRY & MACHINE CO.
MANHEIM, PA.

Bond 136-A Caster. Special double ball race design assures easy swiveling. Durable Bond caster metal provides extra long-life. Roller bearing semi-steel wheel. Pressure lubricated. Wheel sizes from 4" to 12" dia.; load capacities from 600 to 1700 lbs. per caster.



CUT SHOVELING COSTS 2 WAYS!

1 MOVE MORE MATERIAL PER DAY: Because of its special construction with tapered blade thickness and tubular shank, RAZOR-BACK gives you a perfectly balanced shovel of full 13 gauge strength *but only* 15 *gauge weight.* Speeds handling of material.

2 REPLACE FEWER SHOVELS PER YEAR: In addition to its long center "backbone" of 13 gauge steel, which reinforces cutting edge, frog and socket, every RAZOR-BACK is "Surface Peened" after heat treatment, actually tests 2½ to 5 times tougher than fine shovels merely heat treated.

Forged in One Piece, with Extra Long 11 in. Socket.

Send for Catalog, Prices and Distributor's Name

THE UNION FORK & HOE CO.

673 Hocking St., Columbus 15, Ohio

GREATER TOUGHNESS
SURFACE PEENED
LONGER LIFE

RAZOR-BACK

THE SHOVEL WITH A BACKBONE

ALSO STONE, BALLAST, INDUSTRIAL FORKS — ASPHALT AND ROAD RAKES

CUT COSTS for HAND GRINDING OPERATIONS with VINCENT-HUNTINGTON GRINDING WHEEL DRESSERS AND CUTTERS

VINCENT-HUNTINGTON Grinding Wheel Dressers and Cutters are a direct means to increased economy on hand dressing operations. Tough, long wearing Vincent cutter teeth will not break or mush over on the most severe applications . . . producing cleaner, smooth grinding wheel surfaces.

To assure maximum performance in every cutter, rigid standards are maintained for exact hardness. Vincent cutters are heat-treated by an exclusive Vincent process in our own plant, one of the three largest and best equipped heat-treating installations in the country.

Available in a variety of styles and sizes, there is a Vincent- Huntington Grinding Wheel Dresser and Cutter to meet your every need. For your convenience complete stocks are carried at your mill supply house.

Vincent STEEL PROCESS COMPANY

2424 BELLEVUE AVE · DETROIT 7, MICHIGAN

NEW PLANTS AND EXPANSIONS

• New Ryerson Building

A new office building has recently been completed at the Pittsburgh, Pa., plant of Joseph T. Ryerson & Son, Inc. The building is a 2-story steel, brick and stone structure of conventional design, but its location with respect to plant operations, coupled with the engineered arrangement of the general offices, is such that order flow is streamlined to a degree that permits exceptionally fast handling with little if any lost motion. The new building adjoins the warehouse.

General offices are on the first and part of the second floor, the remainder of the second floor being given over to locker space, wash and rest rooms for both office and plant employes. All floors are asphalt tile, ceilings are acoustically treated, and troffer fluorescent lighting used. Heating and ventilating equipment is housed on the roof.

• Marsh Corp. To Build

A new factory and office building will be constructed by the Jas. P. Marsh Corp. on a five-acre tract of land at Howard St. and St. Louis Ave., in Skokie, Ill., suburb of Chicago. According to Barrett Scudder, company president, the building will cover an area of approximately 100,000 sq. ft. and will be a one-story unit of concrete and steel with cut stone facings and with a monitor type roof over the factory to obtain the maximum of natural light for ideal working conditions.

It will be air conditioned throughout and the latest method of sound proofing and lighting will be employed. The new site was chosen, according to Mr. Scudder, to answer the following conditions: adequate property to allow for additional expansion; location in a place free of industrial smoke and grime to insure healthful working conditions; adequate transportation facilities; proximity to Chicago's market

facilities, and a central location in an area to provide high calibre plant personnel required in manufacturing of instruments and heating equipment.

● New Plant

Di Machine Corp., a division of Diebel Die & Mfg. Co., has completed a modern daylight factory located at 2711 W. Irving Park Road, Chicago, Ill. It provides additional space for increased production, for the inspection facilities, and for customer's convenience and comfort. The Di Machine Corp. has plans underway for building a larger capacity, high-speed press, similar in design to its present Hi-Speed Automatic punch press, except for increased tonnage and die space.

● Tool Company's Quarters

Air-Speed Tool Co., Los Angeles distributor for the Air-Speed pneumatic saw and file, has moved into a newly erected office and factory building at 1500 West Slauson Ave., Los Angeles.

Marking the first major expansion of the firm, the one-story modern structure has 8,000 square feet of floor area, providing increased office, warehousing, operational and service facilities for the company, according to Roy Von Seggern, inventor and designer of this tool.

Manufacturing headquarters (Thie-Von Engineering Co.) are also located in the new building which features improved and more efficient work-flow areas, augmented raw materials storage, modern lighting and increased units of production-line machines.

● Rockwell Buys Company

Purchase of the Ohmer Corp., Dayton, Ohio, by the Rockwell Manufacturing Co., Pittsburgh, Pa., has been announced by Colonel Willard F. Rockwell, board chairman and president. J. Allen Harlan, who has served as president

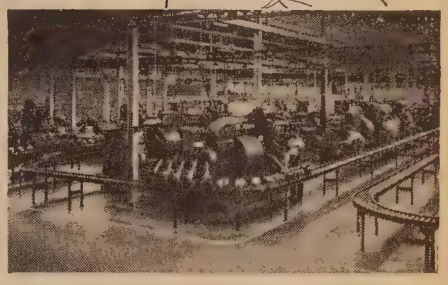
(Continued on page 334)

WHY
PULL
WHEN YOU
CAN
CONVEY

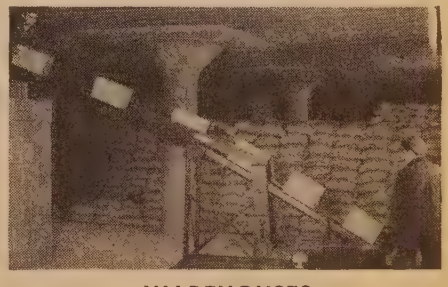
PULLING costs too much. It's a waste of time and manpower. Conveyors can stop this waste. Investigate the use of conveyors. Conveyors handle a wide variety of parts, packages, units, cans, bottles, barrels, bundles, drums and boxes. Available in light, medium or heavy-duty types — portable or stationary — as systems, sections or units — power or gravity fed, they give you remarkable savings in time, money and manpower conservation. They relieve confusion and congestion. Standard Conveyor Company has the experience and facilities to engineer, recommend and furnish the right type of conveyor for your particular needs.

Write today for catalog No. MF-17 "Conveyors by Standard" — a ready reference on conveyor types and systems.

STANDARD CONVEYOR CO.
General Offices: North St. Paul 9, Minn.
Sales and Service in Principal Cities



PRODUCTION LINES
Conveyors keep production moving without interruption.



WAREHOUSES
Handibelt portable conveyor helps pile cartons higher and faster in a warehouse.

LOADING PLATFORM
Cases move fast into cars on sectional roller conveyors — with less manual handling.

ROLLER · BELT · SLAT · PUSHBAR CONVEYORS • PORTABLE CONVEYORS AND PILERS • SPIRAL CHUTES • PNEUMATIC TUBE SYSTEMS

MARQUETTE
Instant arc
A.C. WELDERS

the PRODUCTION MAN'S WELDER

Instant Arc Striking means faster, smoother production welding on light sheet metal because it is so easy to strike and hold the arc. On heavy jobs, the Automatic Voltage Control reduces spatter and assures the best arc. Welding is the shortcut to lower costs and faster production.

the MAINTENANCE MAN'S WELDER

Marquette Instant Arc Welders are truck mounted for easy mobility. Just plug-in the Marquette Welder and you're ready to repair vital machinery quickly and inexpensively without dismantling. Maintenance men find hundreds of jobs they can do better and cheaper with welding, such as, building racks, bins, guards, trucks, etc.

the TOOL & DIE MAN'S WELDER

Broken or worn high speed tools, cutters, drills, punches and dies are quickly and inexpensively built up and hardsurfaced. Make new tools and dies from low carbon steel and hardsurface the working edges. Use versatile Marquette Welders for building jigs, fixtures, gauges, etc.

A MODEL FOR EVERY NEED

Marquette's special transformer design gives you Intant Arc Striking without the use of high frequency or booster gadgets. Model 262 C has built-in Capacitor for High Power Factor. New Telnic Bronze plugs and sockets double current carrying capacity on high heats. Generous use of aluminum increases transformer efficiency. Models 262 and 262 C (with capacitor), 20-275 amps.; 261 and 261C (with capacitor), 20-200 amps. Eight additional models 125 to 400 amps.

WRITE FOR LITERATURE

SOLD EXCLUSIVELY THRU THE NATION'S LEADING DISTRIBUTORS

MARQUETTE
REGISTERED U.S. PAT. OFFICE
Welding EQUIPMENT
A.C. ARC WELDERS · ELECTRODES
GAS WELDING And CUTTING EQUIPMENT
ACETYLENE GENERATORS · ACCESSORIES
MARQUETTE MFG. CO. INC.
MINNEAPOLIS 14, MINN.

(Continued from page 333)

of the Dayton concern for the past year, will remain with the new ownership as vice president. The company will continue to operate as the Ohmer Corp., a wholly-owned subsidiary of Rockwell Manufacturing Co., and maintain plant and headquarters in Dayton.

• Cornell-Dubilier Expansion

Directors of Cornell - Dubilier Electric Corp. have authorized the expenditure of $250,000 for expansion of the company's facilities to meet the growing demand for all types of capacitors, Octave Blake, president, has announced.

During the fiscal year ended September 30, the company spent close to $1,000,000 for expansion, Mr. Blake said. He pointed out that all of these appropriations for expansion were taken out of earned surplus, and that no outside financing has been necessary.

• New Experimental Station

Shown here is the new B. F. Goodrich Chemical Co. experimental station located at Avon Lake, Ohio, which has recently been completed and is now being put in operation. In addition to a modern development laboratory, this new facility contains a semi-work plant where sufficient quantities of material can be produced to determine large scale cost, purity and elimination of difficulties encountered in commercial production.

•Olofsson Tool & Die Plant

The Olofsson Tool and Die Co., Lansing, Mich., has completed a new plant at 2727 Lyons Ave. which will house under one roof the operations of its two former plants. Floor space totals approximately 30,000 square feet and the new site comprises 21 acres of land. The new plant is equipped with every modern facility for complete fabrication in every department of the die and machinery business — all under one roof.

• Personals

▲ Four top division executives were elected vice presidents of the **American Brake Shoe Co.** recently. They include John S. Hutchins, president of Ramapo Ajax Division; William T. Kelly, Jr., president of the Engineered Castings Division and Kellogg Division; Thomas W. Pettus, president of National Bearing Division, and Joseph B. Terbell, executive vice president of the American Manganese Steel Division.

▲ L. H. Billing has been appointed district manager of a newly created **Falk Corp.** sales territory. Formerly production manager at Falk, Mr. Billing directs sales in Wisconsin, Upper Michigan and parts of Iowa. B. C. Bugbee, associated with Falk for five years, has been made production control manager.

▲ **Carrier Corp.**, Syracuse, N. Y., has announced the promotion of O. W. Bynum, who has been manager of the company's western region direct sales activities with headquarters in Chicago since 1944, to manager of direct sales. His headquarters will be in Syracuse. John A. Gazelle has been made manager of distributor-dealer sales and Carl U. Spriggs, assistant general sales manager.

▲ Arthur E. Jacobs has been appointed vice president and sales manager of **Blackmer Pump Co.**, Grand Rapids, Mich. He was formerly general sales manager of the Pump Division of George D. Roper Corp., Rockford, Ill.

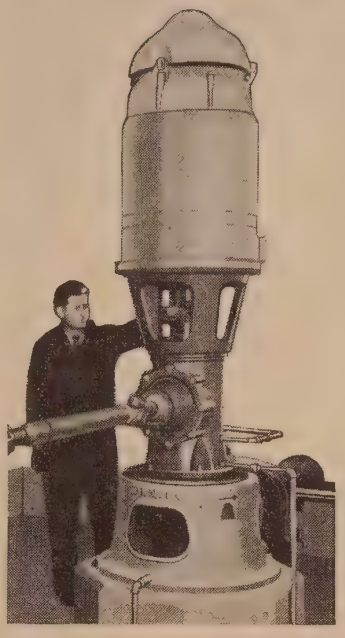
▲ **The Goodyear Tire & Rubber Co.**, Akron, Ohio, has announced appointment of Dr. L. B. Sebrell as director of research and chemical products development. Dr. Sebrell has been head of Goodyear research for 17 years.

▲ Named vice president and manager of **Threadwell Tap & Die Co.**, Greenfield, Mass., is Paul W. Polk, who for several years has been vice president of the Sheffield Corp. which acquired Threadwell Tap & Die Co. last August.

▲ **Aluminum Company of America** has announced the appoint-

(Continued on page 336)

PUMP NOTES by DEMING



POWERED FOR EMERGENCIES

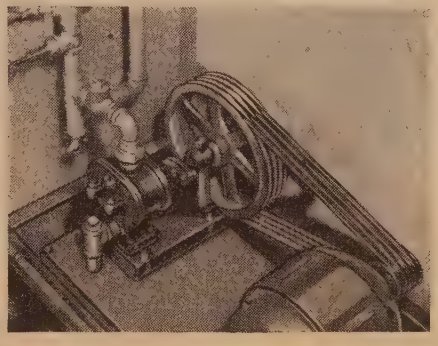
The Deming deep well turbine pump illustrated (at left) is equipped with a combination motor and gear head to assure continuous factory water supply at all times.

Should electric current fail, the pump is operated by an auxiliary engine direct-connected through a flexible coupling to a gear head between the discharge head and motor drive. A flat belt pulley can be substituted for the gear head if the engine is used only occasionally for driving the pump.

Deming deep well turbines can also be equipped with direct current motor head or steam turbine head. *Write for illustrated Bulletin 4700-8.*

"DAY & NIGHT SERVICE"

View at right shows part of a battery of Deming side suction centrifugal pumps operating on a 'round-the-clock schedule in a large refinery. *Write for illustrated catalog bulletins on Deming Centrifugal Pumps.*



MISSING . . . THREE OILERS

The Deming High Speed Rotary Pump shown at left is the heart of an ingenious oiling system that keeps 300 machines automatically lubricated in a large metal working plant. Formerly a crew of four men were kept busy on the oiling job. Now only one man is required to operate the complete system. *Write for complete data on Deming High Speed Rotary Pumps.*

DEMING DISTRIBUTORS LOCATED EVERYWHERE

Close cooperation between Deming field engineers and Deming Distributors makes a hard-to-beat combination of sales-engineering "know-how" to serve your pumping needs. If you don't know where to locate the nearest Deming Distributor, write us.

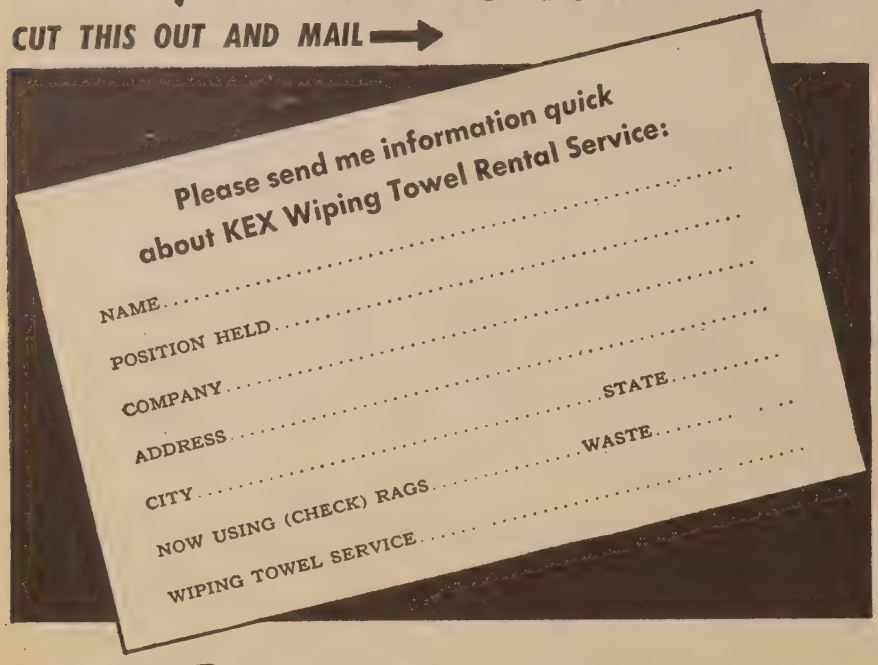
THE DEMING COMPANY • 195 BROADWAY, SALEM, OHIO

DEMING

INDUSTRIAL PUMPS

To cut your INDUSTRIAL WIPING TOWEL COSTS

CUT THIS OUT AND MAIL →



TEAR OUT AND MAIL this coupon today to KEX National Service, 295 Fifth Avenue, New York 16, N. Y.

Learn as fast as you can about KEX quality Wiping Towels. How every square inch of them is usable wiping space—*right out to the very edge.* They are the kind of soft Wiping Towels you can use without fear of marring the most delicate surfaces. They have no buttons, hooks, hard seams or possible ingrained grit that make non-descript rags and waste so hazardous to use. In other words, KEX Industrial Wiping Towels are *manufactured for the very purpose to which you will put them*... and are not cast-offs that have served, and outlived, their purpose.

KEX Wiping Towels absorb up to six times their weight in grease and oil—and give you hundreds of more wipes per pound than make-shift rags or waste.

They are uniform in size and fabric; over-edged to prevent fraying, and are delivered to your plant after they have been cleaned by a special high-heat process—in any quantity desired, as often as necessary.

Get the facts today! There's nothing to buy, no expensive inventory—just a low monthly rental. The very first month should show you considerable saving on wiping costs.

"KEX" NATIONAL SERVICE

REG. U.S. PAT. OFF.

"KEX" REG. U.S. PAT. OFF. NATIONAL SERVICE A CALLAWAY MILLS PRODUCT INDUSTRIAL WIPING CLOTHS

(Continued from page 335)

ment of Frank L. Magee, general production manager, as a vice president of the company.

▲ The **Lincoln Electric Co.**, Cleveland, Ohio, has announced appointment of R. W. Sharp as district manager and sales engineer of its new Indianapolis, Ind., office established at 3343 Central Ave. Mr. Sharp has returned to the company after three years service in the U. S. Navy. He joined Lincoln in 1939.

▲ Henry Chalfant, descendant of one of the founders of **Spang-Chalfant and Co.**, now a division of The National Supply Co., has been elected a director of the company. He is assistant secretary of National Supply Co.

▲ Three top promotions within the sales department of **Republic Rubber Div., Lee Rubber & Tire Corp.**, Youngstown, Ohio, have been announced by O. S. Dollison, vice president and general manager. New sales manager and department head is G. L. Smith, former traveling sales manager. Succeeding him is Myron C. Meyer, formerly assistant sales manager. Ralph W. Deemer, who started with the company as a factory worker but left to enter the advertising field, now replaces Mr. Meyer as assistant sales manager.

▲ F. R. Archer has been named merchandising supervisor of fluorescent products for **Sylvania Electric Products, Inc.** He has been with the company since 1940.

OBITUARIES

▲ Dr. Sanford A. Moss, General Electric Co., consulting engineer, famous for pioneer work on aircraft superchargers and gas turbines, died Nov. 10 at his home in Lynn, Mass. He was 74 years old.

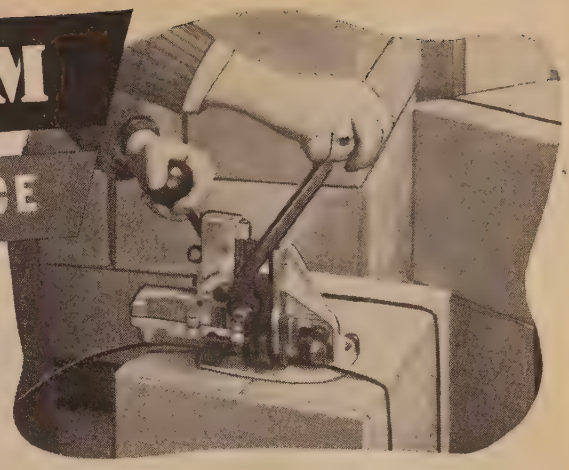
▲ Herman C. Nelson, district sales manager for Bliss & Laughlin, Inc., Harvey, Ill., died suddenly Nov. 3 He had been associated with the firm for 12 years.

▲ John D. Williams, for 23 years New York district manager for SKF Industries, Inc., died Nov. 2 of a heart attack at his home in Ramsey, N. J.

▲ R. E. Post, veteran representative of Fairbanks, Morse & Co. and manager of the firm's Washington, D. C., offices for the past decade, died Nov. 13 after a month's illness.

THE SIGNODE SYSTEM

is a shipping protection SERVICE



Signode steel strapping and seals are merely the basic materials in Signode's complete system of PLANNED PROTECTION for all types of shipping containers — from small, light boxes and packages to heavy palletized units and carloads.

Out of world-wide experience — Signode engineers have developed unique methods of individualized applications to assure decreased damage in transit, reduced shipping room costs and other important savings.

Signode Steel Strapping is unequalled for strength and protection to all types of shipping containers or carloadings.

As a service to shippers, Signode offers the full cooperation of its engineers in planning specific methods of packing and stowing to achieve better shipping protection. You'll profit by a discussion. Write today to our nearest office.

DOMESTIC OFFICES:

Albany, N.Y., 11 N. Pearl St.
Atlanta 3, Ga., 325 Walton Bldg.
Baltimore 2, Md., 406 American Building
Birmingham 9, Ala., 19 Winthrop Ave., Colonial Hills
Boston 10, Mass., 51 Sleeper Street
Buffalo 3, N.Y., 775 Main St.
Chicago 47, Ill., 2600 N. Western Ave.
Cincinnati 2, Ohio, 626 Broadway
Cleveland 13, Ohio, 1200 W. 9th St.
Dallas 1, Texas, 3405 Main St.
Davenport, Iowa, 604 Putnam Bldg.
Dayton 2, Ohio 870 Reibold Bldg.
Denver 2, Colo., 1812 Stout St.
Detroit 4, Mich., 874 Brandt Ave.
Grand Rapids, Mich., 200 Ionia Ave., N.W.
Greensboro, N.C., 908 Lakeview St.
Harrisburg, Pa., Payne-Shumaker Bldg.
Indianapolis 4, Ind., 31 E. Georgia St.
Kansas City, Mo., 758 Bd. of Trade Bldg.
Los Angeles 13, Calif., 440 Seaton St.
Memphis 10, Tenn., 77 McCall St.
Milwaukee 2, Wis., 720 N. Jefferson St.
Minneapolis 15, Minn., 621 S. Third St.
New Orleans 13, La., 340 S. Diamond St.
New York City, 360 Furman St., Brooklyn 2, N.Y.
Omaha, Nebr., 1715 Dodge St.
Philadelphia 8, Pa., 401 N. Broad St.
Pittsburgh 19, Pa. 1224 Grant Bldg.
Portland 3, Me., P.O. Box 1575
Portland 9, Ore., 907 N.W. Irving St.
Providence, R.I., 1216 Industrial Trust Building
Rochester 4, N.Y., 823 Commerce Bldg.
San Francisco 7, Calif., 453 Bryant St.
Seattle 4, Wash., 1020 4th Ave., South
St. Louis 10, Mo., 4453 Duncan Ave.
Syracuse 2, N.Y., 317 State Tower Bldg.
Toledo 2, Ohio, 538 Erie St.
Winter Haven, Fla.
Worcester, Mass., 32 Franklin St.
Youngstown 5, Ohio, 3957 Howard St.

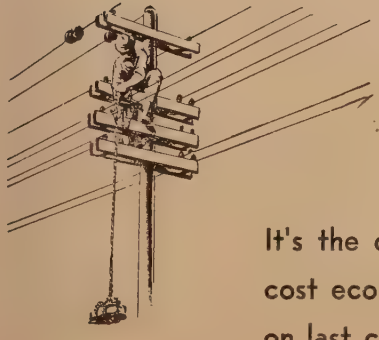
Agencies in Other Countries

Argentina, Australia, Austria, Belgium, Brazil, Canada, Chile, China, Colombia, Cuba, Czechoslovakia, Denmark, Great Britain, Greece, Hawaii, Holland, Iceland, India, Italy, Norway, Mexico, Palestine, Peru, Philippine Islands, Puerto Rico, Sweden, Switzerland, Uruguay, Venezuela

SIGNODE STEEL STRAPPING CO.
2603 N. Western Ave., Chicago 47, Ill.
363 Furman Street, Brooklyn 2, N. Y.
456 Bryant St., San Francisco 7, Calif.

SIGNODE
STEEL STRAPPING

FOR A LONG PULL USE A QUALITY ROPE



There are no bargains when it comes to the purchase of rope.

It's the old story of first cost economy depending on last cost quality.

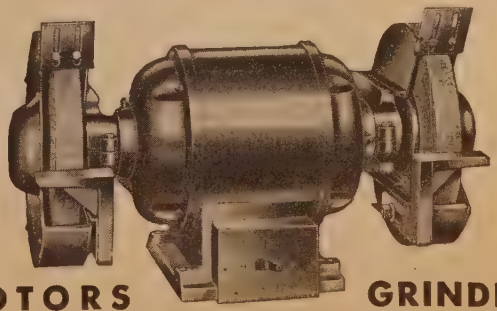
For dependable rope, see your Fitler Dealer; he stocks a quality line.

THE EDWIN H. FITLER CO.
PHILADELPHIA, PA.
Manufacturers of Quality Rope Since 1804

You never take a chance on

VALLEY
BALL BEARING
MOTORS & GRINDERS

Proven again and again by long and economical service everywhere, Valley Motors assure you the utmost in top performance. Motors are drip and splash proof, and provide for low up keep costs and wide adaptability.



MOTORS
From ½ h. p. up to 75 h. p.

GRINDERS
From ¼ h. p. bench type to 5 h. p. pedestal models.

VALLEY ELECTRIC CORPORATION
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CLEAN-
TIGHT-
TROUBLE-FREE!!

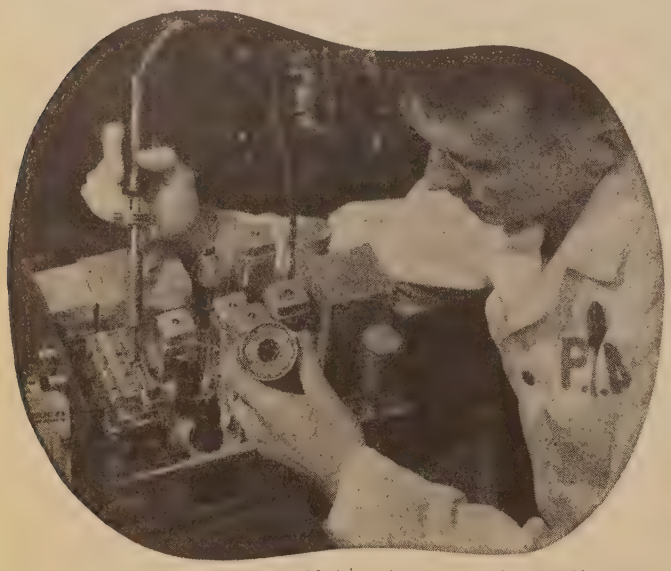

Photo courtesy Pan American World Airways

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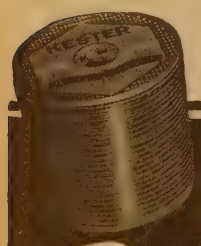


KESTER
Cored Solders
FOR EVERY AUTOMOTIVE USE

SEE HERE!

DOT-DASH-DOT

To show how a name can be made *distingue* by parting in the middle, we recently cited the example of National Marketing's president, A. Urban Shirk. But Mr. Shirk will have to defer to a man who has created a double part. We refer to H. Dickson S. Boenning, member of the Philadelphia brokerage firm of Boenning & Co. For all we know, Mr. Boenning is not only the national doubles champion, but also the only contestant.

THANKS, FRANK

Which reminds us to mention the title conferred on us by Frank Hendershot, financial edtior of the New York World-Telegram. In quoting Mill & Factory, most newspapermen identify us colorlessly as "a trade paper," "the industrial journal," "the magazine," etc.

But Mr. Hendershot did a little embroidering. He started his editorial with, "Mill & Factory, an industrial journal of note . . ." A forehead-floor-brushing salaam to you, Frank, and your notable newspaper.

EDITORIAL WRITERS' BEST FRIEND

Life was hard for newspaper editorial writers before our editors began conducting their monthly polls of opinion on major problems facing industry. Instead of having to squeeze another tired editorial out of topics that had been milked bone dry, now they simply turn to the Mill & Factory surveys, and find a fountain of rich, fresh material, high in butter fat.

And that, dear reader, is the reason why the publication you hold in your hand is the country's most widely quoted trade paper, always excepting, of course, the market publications. For the current survey of the month, turn to page 99.

MR. WEBSTER'S WORD WORKS THREE SHIFTS

Speaking of words that are being kicked around so much that every bone in their bruised little bodies is broken, we would like to call your attention to "realistic." Today everything is *realistic* or *unrealistic*. To prove that the adjective has three-way stretch, our editors applied it in a recent issue to such diverse subjects as (a) the new Secretary of Commerce, and (b) friction sawing—"the Harriman approach will be more realistic . . . "—"friction-sawing became truly realistic just prior to . . ."

Like false teeth sold by Sears-Roebuck, words that apply to any situation fit none well, and our guess is that by about the end of March, "realistic," which was fuzzy in meaning to begin with, will be wearing through at elbows and seat.

HOW TO ARGUE AND WIN

But that does not mean it should be retired from oral use, for "realistic" is as handy in an argument as a pair of brass knuckles. If your opponent makes a point you can't answer, the perfect rebuttal while you stall for time is a patient "Now let's be realistic."

Without being nasty about it, this conveys the impression that he is a starry-eyed idealist, with both feet firmly planted in cirrus cumulus, and what's more doesn't know what the hell he is talking about.

PLEASE SHOW YOUR QUALIFICATIONS

A quirk of human nature we marvel at is the one that makes people dogmatic about the things they know

... By G. H. Dix

least about and cautious about things they know most about. A man may carefully qualify a statement concerning a subject on which he is an authority, but assume a positive position on a matter of which he has little knowledge, say for example the way to settle labor disputes.

Oftentimes there are modest men, who would blush at the idea of telling Culbertson how to execute a Vienna coup or of guiding the hand of a surgeon in a tonsillectomy. They might even defer to the superior knowledge of a lunchwagon cook in how to make a Spanish omelette. But when it comes to solving management-labor clashes, they know all the answers, and the less experience they have had, the more certain they are.

The other day we heard a U. S. senator discuss labor legislation. He prefaced his remarks by saying that he knew practically nothing about the subject, had never studied it, never worked in a manufacturing plant, and implied that he had never even read a book on it. Then he followed the disclaimer with a highly elaborate plan for settling labor disputes which any reader of MILL & FACTORY would instantly recognize as unworkable.

We believe that in the complex matter of labor legislation it would be well to examine the qualifications of those who speak for either labor or management. An amateur is an awful thing.

LET'S NOT BRING FACT INTO THIS

Something we read somewhere the other day fits in here:

"Life's greatest tragedy is the murder of a beautiful theory by a gang of brutal facts."

OUR LIGHT ELIMINATES DARK CORNERS

MILL & FACTORY should be made required reading for labor leaders, legislators, and others who will write or advise on laws to encourage industrial harmony. From our pages they will acquire knowledge, tolerance, and an appreciation of the subject's delicacy. They will learn that it should not be approached in the spirit of a man who tackles a balky carburetor armed with hammer and chisel.

PRAISE WITH STRAIN

Another publication quotes an admirer as referring to itself as "fantastically good." This phrase, it seems to us, is fantastically bad. It is unbalanced. "Good" is a turtle word, far too slow-moving to be teamed up with such a jet-propelled adverb as "fantastically." What is needed is an adjective of higher velocity and an adverb of lower speed. We suggest "passably excellent" or "barely perfect."

LOVE WITHOUT DOUBT

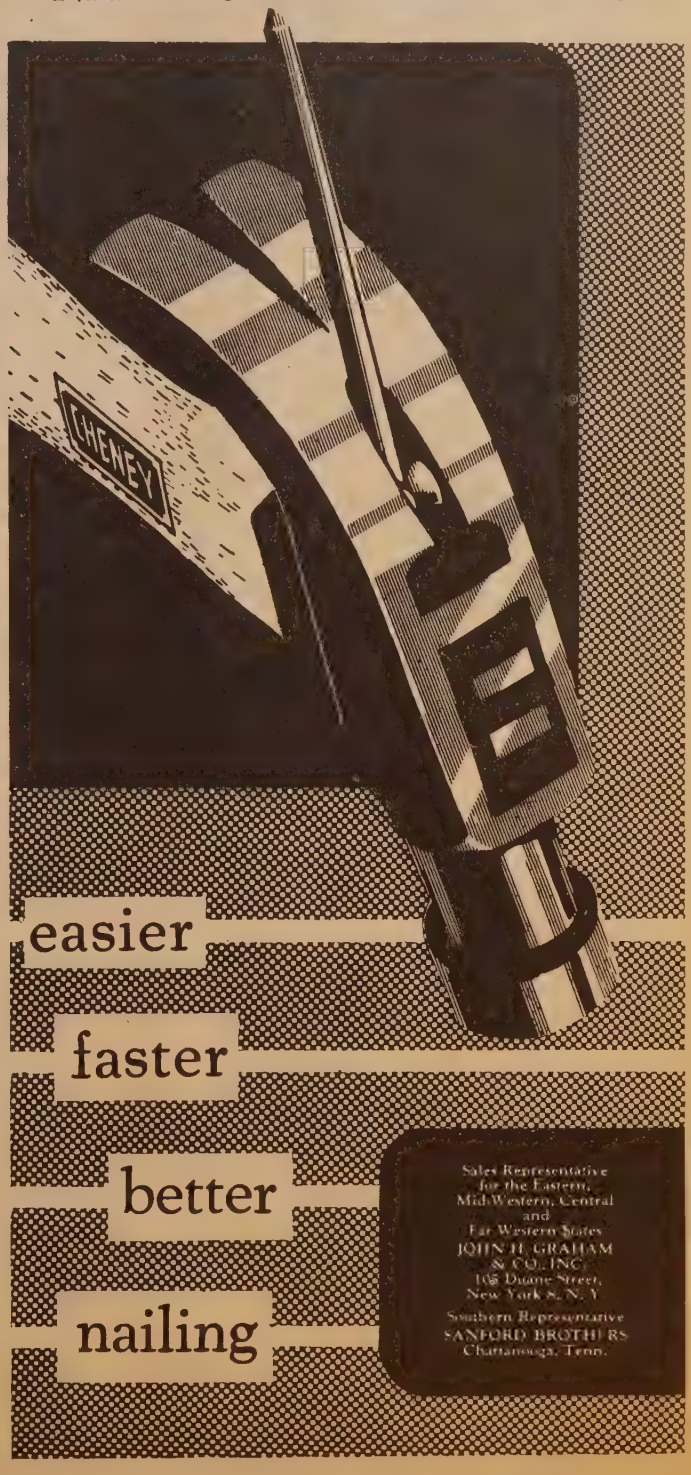
We are fortunate. Our loving readers do not resort to awkward phrases. They lard their letters with such clear and quotable encomiums as:

"Swell job you are doing"
"We make excellent use of it."
"Up to the minute on everything from screw jacks to giant lathes."
"Chuckful of good ideas."

That's what we like—good plain English. We hope nobody ever calls us "fantastically good," as we wouldn't know whether to be happy or hurt.

CHENEY

NAIL HOLDING HAMMERS



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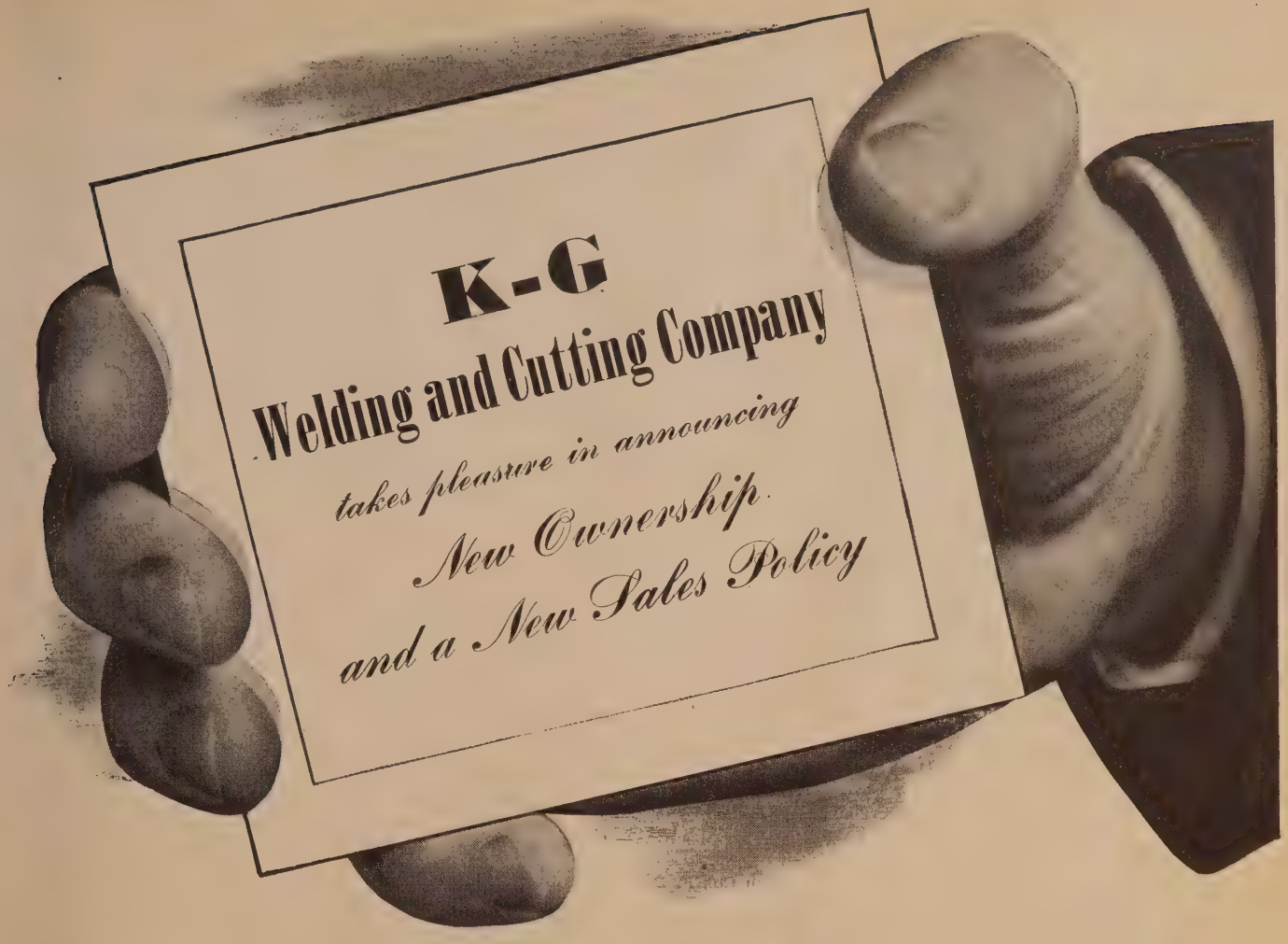

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MILL & FACTORY

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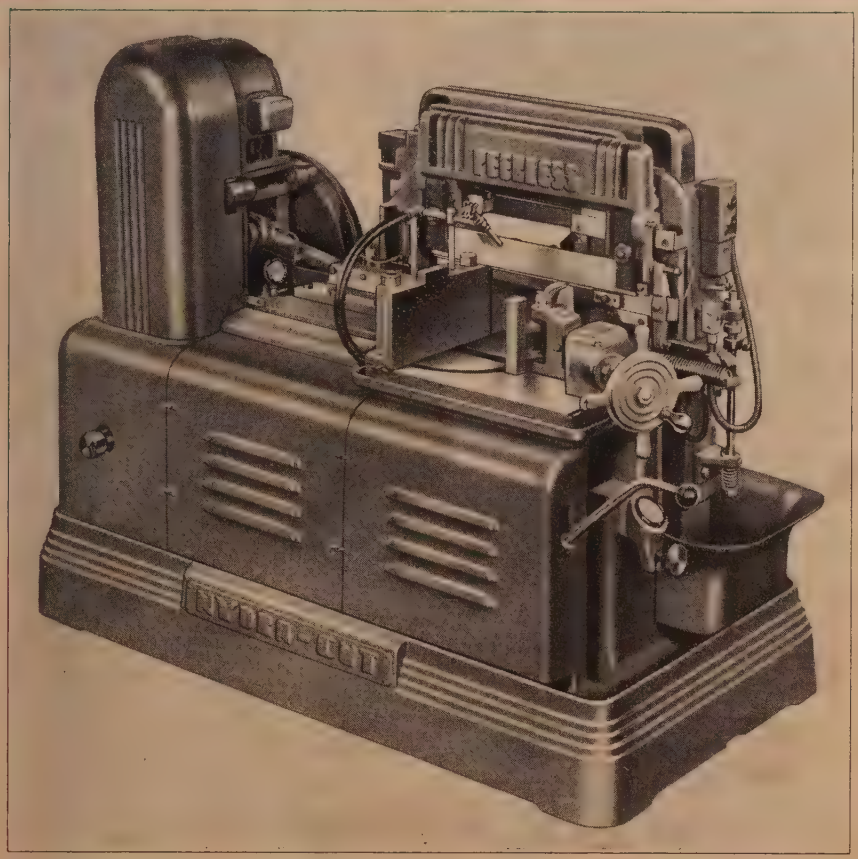

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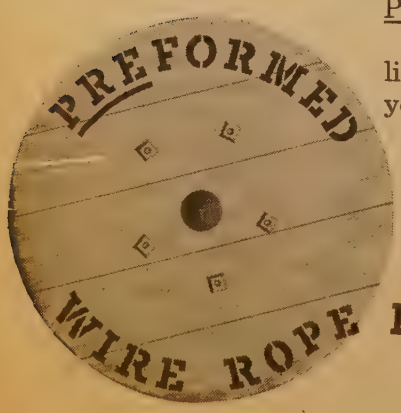

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Are Labor–Management Relations Looking Up?

NOT since pre-New Deal days has labor been so quiet and out of the daily news. Never in its history has the National Association of Manufacturers proposed such a liberal and well thought-out labor policy. And never before has Congress proposed labor bills, which are so sensible and fair in scope that even all-out proponents of labor rights and excesses are hard-pressed to find plausible criticism.

Aside from a continuing deluge of fantastic portal-to-portal suits and a few hold-over strikes, everything seems unusually quiet on the labor front—that is, at the time of this writing, the middle of January. To everyone who has become more or less inured to the ceaseless labor turmoil over the past year, when strikes and man-days lost reached all-time highs, it is sincerely hoped that this present quietude is an indication of better labor-management relations for 1947.

Undoubtedly labor is lying low, while waiting to see what steps Congress will take to correct the evils which have permitted many unions to run roughshod over the American public. Although many people have expected Congress to propose drastic restrictions on the rights of labor, it should be gratifying to both labor and management to see the intelligent approach that Congress actually is taking toward their problem. What the final result will be, nobody can yet foretell. It will probably be a compromise, with labor complaining that it is being restricted too severely; and management feeling that all labor evils have not been adequately curbed.

Whatever does come out of the Congress law hopper, it is to be hoped that 1947 will be a year of productive work instead of industrial turmoil. Everyone is agreed that we are on the threshold of the greatest era of prosperity that this nation has ever seen. We can only enter this era if labor and management end their disputes and get down to work.

Let's start *now*, and not wait to see what Congress is going to do.

Carl C. Harrington

Editor

Photo of an actual shipment using Acme Unit-Load Principle.

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Damage in transit is nil when Acme Unit-Load Band combined with Acme Unit-Load Methods are used for carload shipments.

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PORTAL-TO-PORTAL · · · *The New Road for Labor*

BRIEFED: When this article was written portal-to-portal claims against industrial companies had reached nearly 5 billion dollars. This article explains what has led to these fantastic claims, what labor leaders actually expect to get, and what these claims will mean in future collective bargaining procedures.

By A. N. Wecksler

ORGANIZED labor has reached out to grab off a pot containing billions, but it may prove to hold only fool's gold.

Such is the outlook for the portal-to-portal pay issue that has swept the headlines of the nation's press with ever-mounting and fantastic totals in claims against industry.

Labor unions which instituted the legal suits are looking at their own claims with restrained astonishment. The total sums involved, they know, would mean bankruptcy for many of the firms, and the only portal they would then see would be the outside of a closed door.

Manufacturers are taking the issue coolly. The very size of the claims make them less formidable. Still, there are definite repercussions which portal-to-portal will have, irrespective of the final outcome of the suits for back pay adjustments.

The basic significance is that any appreciable non-productive time which workers are required to spend on an employer's premises will become part of the pay claim of workers in their bargaining procedures.

This does not mean that unions will collect damages in many, or any, of their suits; nor does it mean that by pressing portal-to-portal clauses in contract negotiations, all or many workers will get additional wages in their pay envelopes. It does mean that certain non-produc-

tive time on the part of workers will be recognized as working time, and will have to be paid for at some agreed upon rate.

In other words, the portal-to-portal pay issue is basically one for negotiation and bargaining as part and parcel of wage negotiation, and detailed application at the plant level is not a matter for legal technicalities.

Still, that is exactly where the issue has been lodged by the unions. The case now has become all wound up in such terms as "de minimus" and "amicus curiae."

For labor, this is a new road. As an official of the United Steel Workers of America, CIO, put it:

"It is a new road we are taking. The law says we can take it, but we don't know where it will lead."

Implied in the new road is the abandonment of the traditional dictum of organized labor as seeking "a fair day's pay for a fair day's work." Under this dictum, labor has bargained for a pay scale which takes into account the full working day, or in the case of hourly wages, it has taken into account all the effort expended during an hour—both peak output of effort and such minutes of relaxation as the job may afford.

Now, the claims filed against industry go over past pay periods, and maintain that the pay agreed upon by the union did not constitute full payment for the work put forth—that even though fair pay at the time paid, the payment in retrospect is now no longer fair.

Even the unions find this mental hurdle somewhat difficult to jump, and so they have distinctly labeled the back pay claims as "legal matters," which are being handled by union lawyers. The operating people in the unions profess to know little concerning the back pay claims.

They seek to establish a sharp cleavage between claims for the past, which they brush off as merely a legal equity given them through court action—and the claims for the future, which they seek to negotiate in the new contracts.

Thus, Lee Pressman, attorney for the Steelworkers, is carrying the high policy ball on the legal suits for back pay—while Joseph Scanlon, Research Director of the Steelworkers, is handling the current contract negotiations on the portal-to-portal issue.

As a further justification of their hair-splitting, union officials maintain that the whole matter was forced upon them. They insist that before the unions appeared in behalf of the workers, "shyster" lawyers—as they term them—were rushing to file suits on behalf of individuals. Were such a situation allowed to go on, the matter would never lend itself to settlement. Now, with the unions handling the cases, a settlement can be reached, these spokesmen say.

Unions Anxious to Settle

There are further indications that the unions are anxious to settle. Reason for the haste is that the billions in suits make labor appear to the general public as an ogre which is to swallow up management on a legal technicality. Further, the billions in suits are feeding the mounting animus of Congress and of the public against the concentration of labor power.

But above all, the suits constitute a major diversion from real collective bargaining. With a claim against him exceeding total capital worth of his company, an employer

SUPREME COURT OF THE UNITED STATES.

No. 342.—October Term, 1945.

Steve Anderson, et al., Petitioners, vs. Mt. Clemens Pottery Company.	On Writ of Certiorari to the United States Circuit Court of Appeals for the Sixth Circuit.

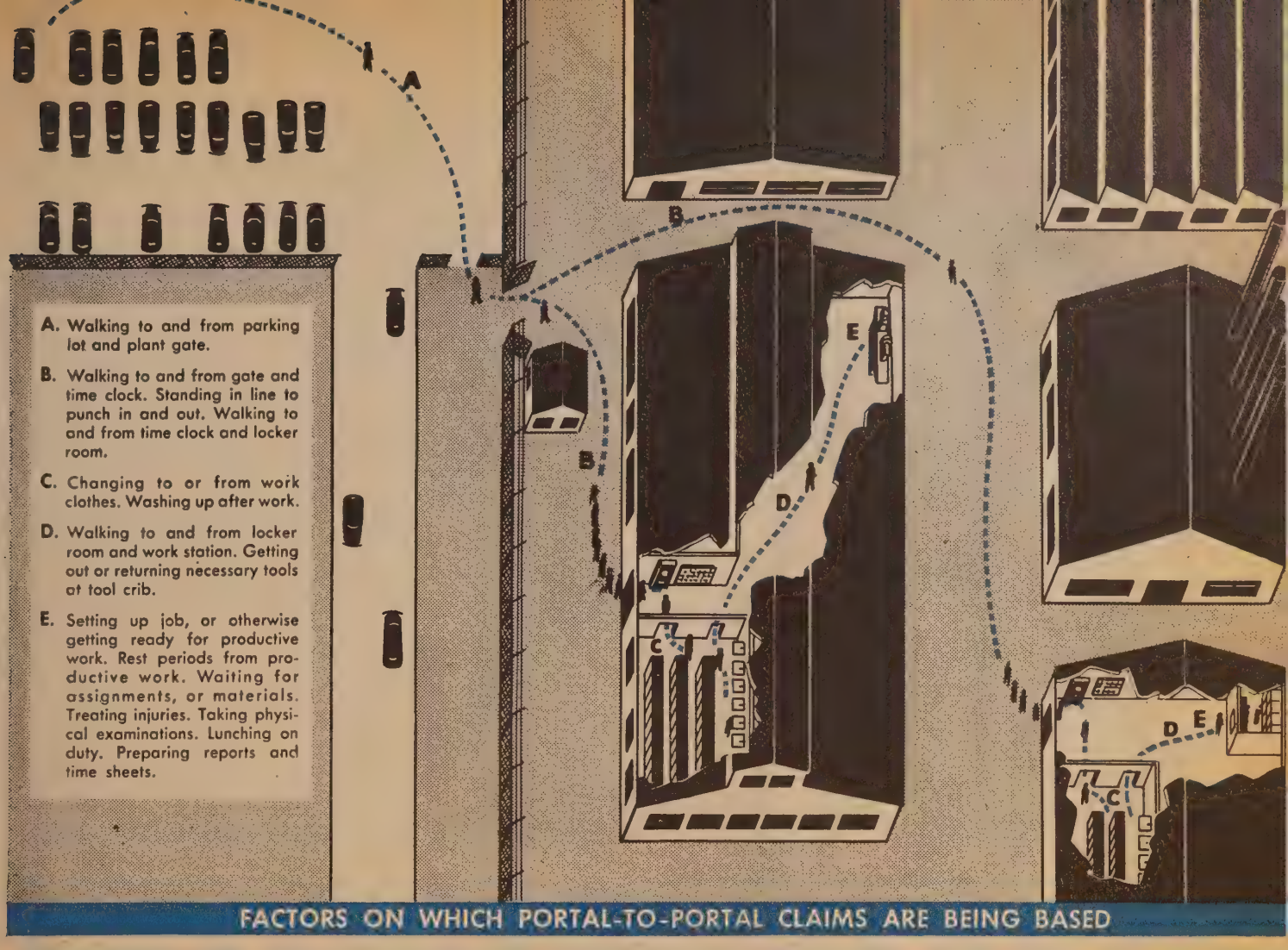
[June 10, 1946.]

Mr. Justice Murphy delivered the opinion of the Court.

Several important issues are raised by this case concerning the proper determination of working time for purposes of the Fair Labor Standards Act of 1938, 52 Stat. 1060, 29 U. S. C. § 201 *et seq.*

The Mt. Clemens Pottery Company, the respondent, employs approximately 1200 persons at its pottery plant at Mt. Clemens, Michigan; about 95% of them are compensated upon a piece work basis. The plant covers more than eight acres of ground and is about a quarter of a mile in length. The employees' entrance is at the northeast corner. Immediately adjacent to that entrance are cloak and rest rooms where employees may change to their working clothes and place their street clothes in lockers. Different shifts begin at different times during the day, with whistles frequently indicating the starting time for productive work. The whistles which blow at 6:55 and 7:00 a.m., however, are the most commonly used. An interval of 14 minutes prior to the scheduled starting time for each shift permits the employees to punch time clocks, walk to their respective places of work and prepare for the start of productive work. Approximately 200 employees use each time clock during each 14-minute period and an average of 25 employees can punch the clock per minute. Thus a minimum of 8 minutes is necessary for the employees to get by the time clock. The employees then walk to their working places along clean, painted floors of the brightly illuminated and well ventilated building. They are free to take whatever course through the plant they desire and may stop off at any portion of the journey to converse with other employees and to do whatever else they may desire. The minimum distances between time clocks and working places, however, vary from 130 feet to 890 feet, the esti

First page of Supreme Court decision on the Mt. Clemens Pottery case.


A. Walking to and from parking lot and plant gate.
B. Walking to and from gate and time clock. Standing in line to punch in and out. Walking to and from time clock and locker room.
C. Changing to or from work clothes. Washing up after work.
D. Walking to and from locker room and work station. Getting out or returning necessary tools at tool crib.
E. Setting up job, or otherwise getting ready for productive work. Rest periods from productive work. Waiting for assignments, or materials. Treating injuries. Taking physical examinations. Lunching on duty. Preparing reports and time sheets.
A
B
B
E
D
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D
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C

FACTORS ON WHICH PORTAL-TO-PORTAL CLAIMS ARE BEING BASED

is in no position to bargain concerning wage rates. Specific contract terms involving portal-to-portal pay elements might be held to prejudice the court position of the employer in regard to the back pay claims.

Still another factor which impels union labor leaders to seek settlement is that while the huge amounts tend to confuse the public, they also befuddle the individual union members on whose behalf the sums are claimed. It is inconceivable to the union leaders that any court ruling would even approximate the amounts for which the suits have been entered, and if union labor gets the idea that they are due large sums of money, their loyalties may be shaken when the suits produce little or nothing.

Peculiarly enough, the unions partially ascribe their presumptive favorable legal position on what they consider to have been a tactical blunder on the part of industry. A union legal spokesman claimed that:

"Industry was asleep at the switch. When the portal-to-portal case (Mount Clemens Pottery) was up before the courts for a rehearing, the indications were obvious, but no one except the manufacturer at interest filed a brief. Under similar circumstances, were union labor affected adversely, unions throughout the country would have filed briefs in great number, to impress the court with the gravity of the case."

Turn-About

One legal maneuver that labor was not looking for, and which has evoked considerable interest is the counter-action filed by Col. W. F. Rockwell, president of the Rockwell Manufacturing Company. Colonel Rockwell likes to step off in new directions, and when the union in his plants sued him for $3,000,000 for portal-to-portal, he filed a counter-suit for $15,000,000.

Colonel Rockwell feels that his suit has as much moral equity as does that of the union, and that his legal grounds are equally valid.

He maintains that workers in his plants consistently stop working before the whistle blows. He holds no ill-will against his workers, but merely claims that he can show by the testimony of his own workers that they consistently slow down toward the end of the day, and for the last portion of the day, do nothing at all.

Under a spirit of give-and-take, he has been willing in the past to forego levying a legal suit against the workers, but when a suit was brought against him saying that he was not paying his workers in full for their time—it festered a long nurtured grievance of his own.

To support his claim to having paid a fair day's wage in the past, Colonel Rockwell points out that the officers of the union in his plants, when they were campaign-

MIDWESTERN EDITION

STEEL LABOR

THE VOICE OF THE UNITED STEELWORKERS OF AMERICA — C.I.O.

Vol. XI Indianapolis, Ind., December, 1946 No. 12

PORTAL to PORTAL PAY

THE SUPREME COURT SAYS—

"You Sh

USA WILL FIGHT TO WIN PORTAL PAY IN STEEL

Gigantic Project Based On Wage and Hour Law

The United Steelworkers of America is preparing to file law suits, where necessary, against several hundred basic steel and fabricating companies to force portal-to-portal provisions of the Wage-Hour Law.

Where union members have a legitimate claim to collect portal-to-portal pay, the union will file individual suits for its members.

It will seek to collect back pay due the membership under the portal pay provision of the Wage-Hour Law.

The project is one of the most gigantic ever undertaken by the United Steelworkers.

WHEN YOU ENTER AND LEAVE THE GATE

WHEN CHANGING CLOTHES

AND COLLECTING TOOLS

AND SITTING AT

CONTACT YOUR LOCAL OFFICERS

SIGN AN AUTHORIZATION

FILL OUT QUESTIONNAIRE

Cover of United Steelworkers' union paper.

ing for re-election to office, boasted that under their leadership the union had obtained the best labor contract of any in the Pittsburgh area.

In his counter-suit, Colonel Rockwell has made the following claims:

"The employes of Defendant allegedly for whose benefit this action was instituted, disregarding the letter and intent of the contracts, have conspired together with the intent of limiting production of items manufactured by the Defendant; have conspired together to limit piece work production of manufactured items to an arbitrary figure selected by them; have jointly and severally refused fully to apply themselves to the production of manufactured items during the eight-hour day and forty-hour week referred to in each of said contracts of employment and have in divers and sundry other ways violated each of said contracts by refusing to apply themselves to the duties assigned to them. As a result whereof they have received and accepted compensation for time in excess of the time acutally worked by them.

"By reason of the acts of the employes of Defendant allegedly on whose behalf an action was instituted, said employes of Defendant have been unjustly enriched by reason of payments to them of compensation in excess of the compensation due for work actually performed, and in addition thereto Defendant has been caused to suffer losses in sales of merchandise by reason of the failure of the employes of Defendant to produce items of merchandise according to the production standards of the Defendant; the good-will and reputation of Defendant has been damaged by reason of its inability to meet the demands of its customers and its inability to fill orders placed by customers due to lack of items of merchandise which could and should have been manufactured.

"Wherefore, Defendant has been damaged in the amount of not less than Fifteen Million Dollars ($15,000,000), and, therefore, files this Counter-claim and demands judgment therefor."

Other industrial leaders take a less belligerent view of the portal-to-portal issue. There is general agreement that during the war and during the tight labor market period following the war, there have developed practices in their labor force which have been highly uneconomical. Make-work practices, limitations on output and slowdowns have reduced the potential of production.

Reducing Portal-to-Portal Time

On the other hand, there is indication that there are technical approaches toward limiting the amount of non-productive "working time." During the war, as an example, there was necessary emphasis on security, with the number of entrance gates to plant property held to a minimum. Where it is possible to break through new gates and give quicker entrance to a plant, such measures could be undertaken.

Such action would normally be taken as a result of a grievance, and would be settled through normal grievance procedure. Grievances having to do with other plant practices as being wasteful of workers' time, are susceptible to similar solution — and when the smoke of legal red tape has been cleared, it is altogether likely that

"What have I done to deserve this? Why aren't I too being sued for portal-to-portal pay, like every other up-to-date company?"

such bargaining procedures will again be employed.

Before the red tape is dispelled, however, Congress is likely to take some action clarifying what should be considered as compensable time under the overtime provisions of the Wage and Hour Law, and there is also considerable sentiment for legislation calling for wiping out or limiting past liabilities.

When the smoke lifts in the courtroom, and unions are again able to see the collective bargaining tables through the haze, it may well be that the bare framework of the Mount Clemens Pottery Company case will remain as a guiding policy that any appreciable time expended by labor on an employer's behalf should be compensated for at a rate arrived at through bargaining.

The large preponderance of legal suits may well prove to have delayed an agreeable working procedure on payment for so-called non-productive working time—and without collection of the fantastic sums mentioned in the law suits.

LEGAL TIME-TABLE ON PORTAL-TO PORTAL.

U.S. Supreme Court ruled on March 27, 1944, in the Tennessee Coal, Iron and Railroad Company vs. Local 123 that "immemorial custom" and collective bargaining agreements in iron ore industry which established the "face-to-face" yardstick of working time—that is, the time during which the worker was actually face-to-face with his station and tools of work—were not applicable when this measurement of working time bore no relation to the time actually worked. For the first time, underground travel time was legally held to be considered working time under the Fair Labor Standards Act.

* * *

U.S. Supreme Court ruled on December 4, 1944, in Armour vs. Wantock that auxiliary foremen on standby duty while awaiting call in case of fire, even though engaged in recreational activities, should be compensated for their time under the Fair Labor Standards Act. This decision was important in that it established the principle that waiting time, when required in the interests of the employer, should be considered as working time.

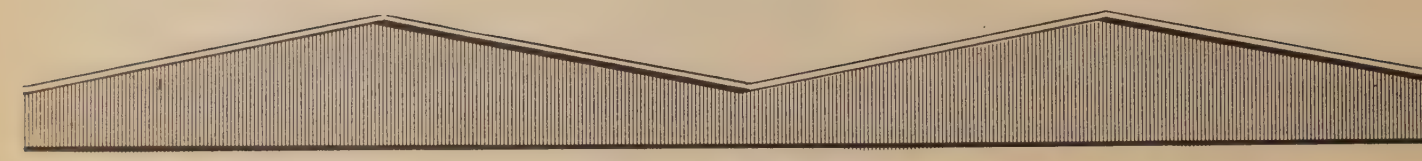
* * *

U.S. Supreme Court on May 7, 1945, in Jewel Ridge Coal Corp. vs. United Mine Workers, affirmed the previous ruling in the Tennessee Coal case, and merely extended the same principle to the mining of coal which it had upheld in iron ore mining.

* * *

U.S. Supreme Court ruled on June 10, 1946, in Anderson vs. Mt. Clemens Pottery Company that travel time above ground could be included in overtime computations. Also included under the decision were a variety of activities which were merely preparatory or incidental to actual productive work. At the same time, the Court held that trifles in the matter of time were not to be included.

UNDER ONE ROOF



Two bays of this former airplane modification center house some of the airliners which serve Birmingham.

This room, formerly the upholstery shop for B-24's and B-29's, is now the sewing room for children's clothes.

WAR planted a huge white elephant at the doorstep of the City of Birmingham, Ala., but the local industry leaders have converted this liability into a distinct asset.

It all concerns a surplus war plant —a $13,828,000 airplane modification center used during the war to modify the B-29's for special service in whatever area they were to be assigned.

The plant is located on 250 acres, and the buildings where the actual modification work was carried on are huge. In addition, there are numerous smaller airplane hangars, supply buildings, storage buildings and service units, many of them built of concrete.

One industry could hardly make use of plant space so large, or so diverse in its nature. The answer was to get a number of tenants. Birmingham's business men were anxious to keep the plant running. There are raw materials in the area, and a considerable residue of skilled labor, trained during the war for industrial jobs.

The next step was to comb the area for possible tenants. The Reconstruction Finance Corporation, which was then handling the disposal of plant facilities, was contacted, and a plan for "multiple tenancy" of the plant was approved. A rental rate was established and the Birmingham business men went to work. Here is what they had to dispose of:

A main modification building, 725 feet wide and 1780 feet long, which housed 10 bays, each 160 feet clear span, one story with a clearance of 40 feet to the bottom trusses—big B-24's and B-29's were modified in these bays; they had to be big as ofttimes they housed as many as a dozen of the big planes at one time. A couple of football games could be staged at the same time in one of the bays.

Building Features

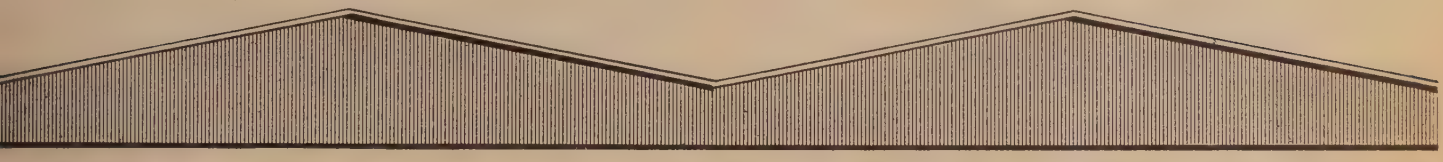
There were also two service bays, each 50 feet wide and two stories tall, with a 16-foot clearance on the first floor and 12-foot clearance on the second floor. There was also a third service bay 80 feet wide, two stories tall. The heating units for the entire plant are located in the service bays. The building has a structural steel frame on concrete foundation with a side wall of 20-gage asphalt treated steel. The roof has a steel deck with built-up roofing.

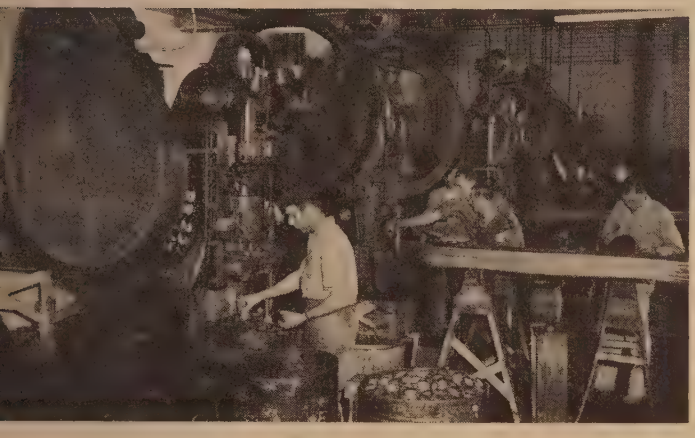
All ground floors are of concrete with the second floors of the service bays made of two-inch wood. All division walls between the bays are fireproof. The main bay doors are a canopy-type fabricated steel—40 feet high and with a full opening. The doors are electrically operated and move with the grace of Superman as they open up into the roof. Each main bay has 116,000 square feet of rental floor space. There are also twelve other smaller structures, including several administrative buildings.

The first tenant was the Southern Furniture Service Company, an outfit that rebuilds and reupholsters used furniture. This company had offices in Atlanta, Georgia, and Knoxville, Tennessee. As soon as materials become more plentiful this company anticipates building new furniture in Birmingham. They are now buying a large quantity of their materials in the Birmingham area.

Signing the first lease was the spark plug. The results as of this writing are as follows:

BRIEFED: This plan for the multiple tenancy of a surplus wartime airplane modification center has turned a supposedly white elephant into a potential black-ink profitable activity. Some 94 per cent of the available space has been leased or is on option for use, and the project houses a wide variety of industries.





Presses stamp out parts from Birmingham-made steel for makers of auto jacks and wagons for children.

At work on a heavy-duty, low-hung trailer. In the rear of the picture can be seen one of the complete trailers.

Ninety-four percent of the available space has been rented or is on option for lease or sale. More than 2,000 persons are already employed, and as the other operators with options and leases get underway, it is expected that some 10,000 persons will be on the payroll in the numerous industries at the former modification center.

Diversity of Tenancy

The big plant that was solely built for war purposes, now houses a manufacturer of small automobiles; a rebuilder of used furniture and manufacturer of new furniture; an aircraft parts and supplies distributor; a manufacturer of concrete block machinery and a moulder of waterproof concrete blocks and architectural designs for buildings; a builder of phonographs, radio and phonograph parts; two companies engaged in flying lessons for GI's and others, aircraft repair, sales and garaging; a wholesale hardware distributor, who does much business with the new industries at the site; a manufacturer who takes steel from Birmingham mills and turns out automobile jacks and little red wagons for boys and girls; a cabinet shop that turns out kitchen cabinets, doors, frames, fixtures and furniture stocks; a builder of playground equipment; a general machine shop that takes care of the many intricate tools at the plant that once turned out war goods and now is devoted to peacetime production; a general auto garage and repair shop to care for the hundreds of cars that come to the site each day; an establishment of veterans who are turning out a new cleaning fluid that was developed during the war; two manufacturers of steel heavy duty trailers; a manufacturer of the newly developed aluminum screens, "guaranteed to last a lifetime"; manufacturer of nationally known children's goods, who is taking advantage of machinery formerly used in making the upholstery for B-24's and B-29's; a cafeteria that is capable of feeding 5,000 persons at one time; 232,000 square feet of warehousing for storage of war surplus goods, in addition to three administrative buildings that handle all of the war surplus disposal business in Alabama; two large bays now serving continental airliners as well as a large hangar, formerly used as a paint shop to camouflage the large bombers, now serving and housing Birmingham folks who own their own airplanes.

Private Flying Facilities

Several enterprising Birmingham men were interested in the development of private aviation in Birmingham. The result was the leasing of a wooden shed, 1,500 feet long by 50 feet, used for garaging small ships and warehousing supplies during the war. The Aircraft Sales and Service Company was born and they specialized in giving aircraft lessons to GI's under the provision of the GI Bill of Rights. This outfit also serviced and housed private planes and made sales of airplanes.

The shed they leased was more space than they needed. Radio Electronic Engineers, manufacturers of phonographs and radio-phonograph combinations, came in at this point and took some of the extra space. Still some space was available, and this was leased to the Alabama Steel Products, manufacturers of playground equipment and automobile accessories. Another new industry, the Freezerator Company, manu-

One unique industry using this building is a company making waterproof concrete blocks and stone castings.

In this area Southern pine and other lumber are made into kitchen cabinets, door frames and other furniture.

facturers of quick freezing units, was also placed in the structure. All of these industries are new to Birmingham, and are using materials from the Birmingham district as well as Birmingham labor.

With five tenants on the ground, there came a need for a private garage to service the motor cars of the persons employed. This was immediately set up by George Sawyer, a mechanic who formerly tuned up B-24's and B-29's. He is now engaged in his own business on the same site where he learned much of his trade.

Advantages of the Plant

The advantages of the former modification plant were becoming well known throughout the district. Two Birmingham men, who manufactured hand grenades and other war equipment during the war, were looking around for peacetime equipment to manufacture. They leased 40,000 feet in one of the service bays and are now turning out automobile jacks and children's red wagons. They take Birmingham-made steel in sheets at one end of their plant, and turn out the finished products at the other. The company, known as Dixie Consolidated, Inc., employs 300 persons.

About this time, the War Assets Administration, having outgrown its small downtown office space, began looking for larger quarters. The three buildings used by the Bechtel - McCone Corporation for administrative purposes fitted the bill. The move served a two-fold purpose. WAA was itself making use of war surplus real property, and WAA officials were close to the huge bays that were being filled up with war surplus property gathered from the war plants and facilities from over the State as they were being closed.

Large-Scale Feeding

After WAA moved to the plant, and more and more industries began moving in, bringing more people, the problem of large-scale feeding arose.

The plant's huge cafeteria, which had fed some 5,000 persons at a time during the war years but which had been idle since shortly after V-J Day, was brought back into use. Two veterans, James Gentry and Christopher Mosley, signed a lease and opened the eating place. As the industries grew at the plant, their business likewise expanded. At this writing they are employing 19 persons.

Another "war baby," aluminum screens and frames, attracted the attention of a Birmingham capitalist, who applied for space in the plant. One of the smaller structures was rented to him, and now these new screens—"guaranteed to last a lifetime"—are made in quantity.

The availability of electricity and war surplus equipment in one of the large bays attracted Edgar L. Mitchell, who needed more space for his millwork and wood products business. Now the Mitchell Industries is leasing half of one of the large bays, and is making kitchen cabinets, doors, door frames and fixtures, furniture stock and general millwork for new houses. He obtained much of his equipment from WAA, and lathes that once turned out tools of war for soldiers are turning out home fixtures for veterans. The mill employs 50 persons and makes much use of Alabama timber.

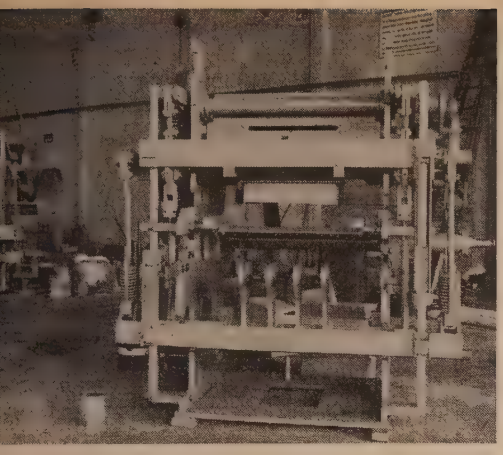
As Birmingham became more and more important in the aviation world, with 39 flights on four major airlines coming into the city daily, Birmingham City Commission President Cooper Green became interested in getting more hangar space for the lines. Arrangements were completed, and the airlines are now using two of the huge bays, or 232,000 square feet. Thus the big bays that once housed the big bombers are now housing the big DC-3's and 4's—most of them having seen war service and now converted to peacetime airline traffic.

Two Army colonels, who organized Kleenize, Inc., to produce a cleaning fluid discovered during the war for use in cleaning flying suits and helmets, opened in a small space across the street from the former Bechtel-McCone plant. As their business expanded, they moved into one of the service bays.

A General Machine Shop

As various machines were put into operation at the former modification plant, the Krone Manufacturing Company, operators of a general machine shop, sought space and were moved into one of the large sheds. Some space being left in the 51,000 square foot shed, the Birmingham Manufacturing Company, fabricators of heavy duty steel trailers, moved in.

Three more tenants were quickly added—the Alabama Stone Casting Company, manufacturers of waterproof concrete blocks and general stone casters; the Mill and Textile Supply Company, wholesale hardware dealers; and the Southeast Joslyn Company, wholesale electrical material suppliers. The latter



Here are two cement block makers a company is planning to manufacture in one of the plant's bays.

two have supplied much material and equipment to their nearby neighbors occupying the same plant site.

An 18,000 square foot hangar, used during the war as a paint shop and very desirable for housing airplanes, was available, and Skycraft, Inc., rented this hangar. It has 40 foot doors like the big bays, and now houses a number of planes.

A Clothing Business

To add a bit of variety to the tenancy, the McCain Manufacturing Company rented the room that was formerly used as an upholstery shop for the big bombers. Practically all of the electrical equipment was intact and only sewing machines were needed. This outfit employs 40 persons and makes use of Alabama cotton in manufacturing their children's clothing under the brand name "Tommy-Boy."

Another company that handled war contracts and was looking to peacetime conversion, the Fontaine Truck Equipment Company, Inc., leased half on one of the bays, some 52,000 square feet. This company manufactures a special heavy duty trailer for the purpose of hauling tractors, cranes and other heavy objects. Naturally, most of their products come from the Birmingham district, especially the steel.

The New Holland Machine Company was next to get space in the plant, and they were located in a service bay with space to meet their needs. This company distributes flame throwers which they designed especially for use in connection with the cultivation of cotton. The Dixie Consolidated Company manufactures the flame throwers of the New Holland Company. The Veltex Company also rented a part of this service bay for the expansion of its chemical manufacturing business.

Small Auto Manufacturing

Next to appear was an industry which promises to employ several thousand persons and to use large quantities of Birmingham-made steel in the manufacture of their product—a small automobile called the Bobbi-Kar.

The Bobbi Motor Car Company first started to establish in California, and then decided that the iron and steel industry of Birmingham provided more suitable conditions for their operation. The car, according to their plans, will have a 92-inch wheel base, and a 25 horse power motor located in the rear.

No cars have been turned out at this writing, but plans for the assembly line are taking shape.

The motor car company has an option on approximately 680,000 square feet, and is in the process of completing a firm lease. This company has contracted for a large amount of machinery and equipment from the War Assets Administration. Hand models of the new machines are now being completed.

The latest lease to be completed was with the Besser Manufacturing Company for 60,000 square feet in one of the big bays. This company has been producing concrete block machines and other concrete machinery for a number of years.

At the new location, the company expects to supply the demand for its product in the Southern States. Because of improved labor relations in the South, they expect to build the machine in its entirety in Birmingham, using Birmingham-made steel. This outfit also purchased large amounts of its equipment from the War Assets Administration.

Neighborly Relations

How are all of the neighbors in this big plant getting along? Mr. McClellan Ratchford, regional WAA director, says "like one big family." Most of the employes eat at the big cafeteria; many of them share their cars in coming to and from work, and a friendly spirit prevails.

In the allocation of space, the needs of the prospective lessees were determined. They were then located in space most advantageous to them.

Many of WAA's war surplus tools located in the big plant during the war were either left in their places or removed to spots more advantageous for the tenants. Because of the wide diversity of industries in the plant, there is no mutual use of the tools.

There is no central labor office located at the plant, but as soon as a tenant moves in, the Birmingham Employment Office is notified.

In the location of the tenants, transportation needs were considered. A spur railroad track runs into the plant, and those industries that would most need the railroads were placed nearest to the spur. As the other industries in the plant expand, it is expected that the railroad facilities will have to be expanded. As all of the plants are located on the 35 acres of concrete surrounding the plant, motor and air transportation are easily available.

The cost of utilities is borne by the lessee. Where it is not convenient to establish electric meters for lights, WAA furnishes lighting requirements and is reimbursed on a per hour, per fixture basis. A check is made as to the length of time that the lights remain burning in order to fix the electric charge. A separate power line has been installed by the Birmingham Electric Company to furnish power needs for the various lessees. It is necessary in these cases for the lessee to run his own power line into his space.

A bus line also runs right in front of the plant, affording transportation for those without private means of travel.

The maintenance cost of the main modification building is borne by the lessee, except the roof, which is maintained by the WAA. The maintenance charge for the smaller industrial buildings surrounding the main modification structure is borne by the lessee. Because of the acres of concrete, there is little ground maintenance.

The WAA assists the lessee in arranging for telephone service and other minor services that can be handled through the rental office.

Rent is based on the square footage, the rate being 25 cents per square foot per year. Thus it can be seen that when all of the plant is occupied, the rent will net Uncle Sam around $400,000 a year.

The City of Birmingham has a number of new industries that use numerous Birmingham-made products and resources and which also are helping take up the sag in employment that accompanied reconversion.

The huge modification plant is not a "white elephant." It is an asset to its city, state and nation.

Stove Output

One of the two long conveyors on which the stoves are assembled. The 3-deck carriers for enameled parts conveyor are at right.

THERE'S a new stove and furnace plant out at Kalamazoo, Mich., said to be the most modern and efficient in the industry. True, most of the buildings are not new, but just about everything in them is new—and different.

Nor is the company a newcomer in this field. In fact, it has been established for nearly half a century. It's the Kalamazoo Stove and Furnace Co.—the same one that popularized the slogan, "A Kalamazoo Direct to You."

But there has been something like a revolution at Kalamazoo Stove and Furnace Co. Nearly everything except the walls of the buildings is new; new products, new equipment, new methods, new procedures, new distribution plans, new enthusiasm.

There are several new buildings, too. Specifically, the amount of productive floor space has been increased about 27%, and some new warehousing and shipping facilities are being added.

But the most remarkable fact is that with an increase of only about 27% in productive floor space, capacity has been tripled. This has been accomplished by modernizing the facilities throughout, with emphasis on mechanical handling and other mass-production methods.

Prior to World War II, Kalamazoo stoves, furnaces, heaters, and related products were sold direct to consumers; first, by direct-mail, and later through a chain of some 250 company-owned retail outlets. The company had its own foundry and there was plenty of cast iron in its products. Then, when the war began, the plants were changed over to produce armor plate and some precision parts. Existing equipment was totally unsuitable for war work, of course, and it was moved out entirely. Much of it was sold. This was a new and radically-different kind of work for both management and personnel, and it doubtless contributed to the vision which the management acquired.

At any rate, they knew that when

Tripled by Modern Methods

By D. G. Baird
Detroit Editor

BRIEFED: By a sweeping modernization of their plant facilities, the management of the Kalamazoo Stove and Furnace Company have been able to triple the output of their stoves. How and what they did is explained here, as well as a breakdown of new assembly operations.

their contracts terminated, and the time arrived for them to go back into the stove business, they would have to reconvert their facilities 100%, so they began planning to make a thorough job of it.

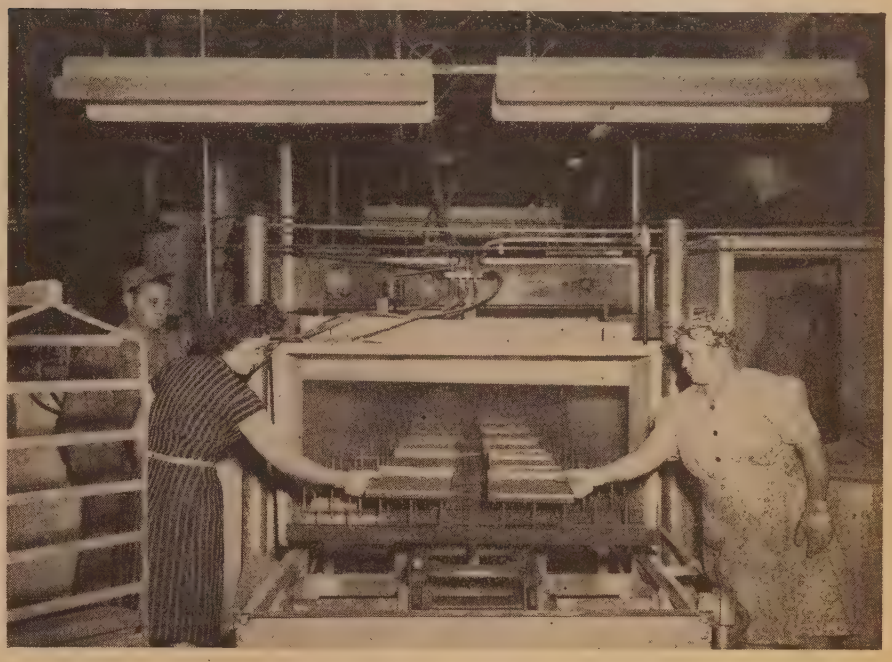
For one thing, they decided to change their system of distribution completely. Their retail stores had been closed during the war and were not reopened, with the exception of a few to be used largely as models. They obtained contracts to supply stoves and furnaces to a large number of department stores and other establishments and they made plans for franchising about 1000 exclusive dealers in protected areas They had their existing products redesigned and arranged to add several new items to the line. They woud build gas ranges, electric ranges, combination gas and coal stoves, coal and wood stoves, heaters, and a complete line of oil, gas, and coal furnaces. They would have electric refrigerators and washing machines made in other plants.

Market surveys and analyses were made and quotas were established.

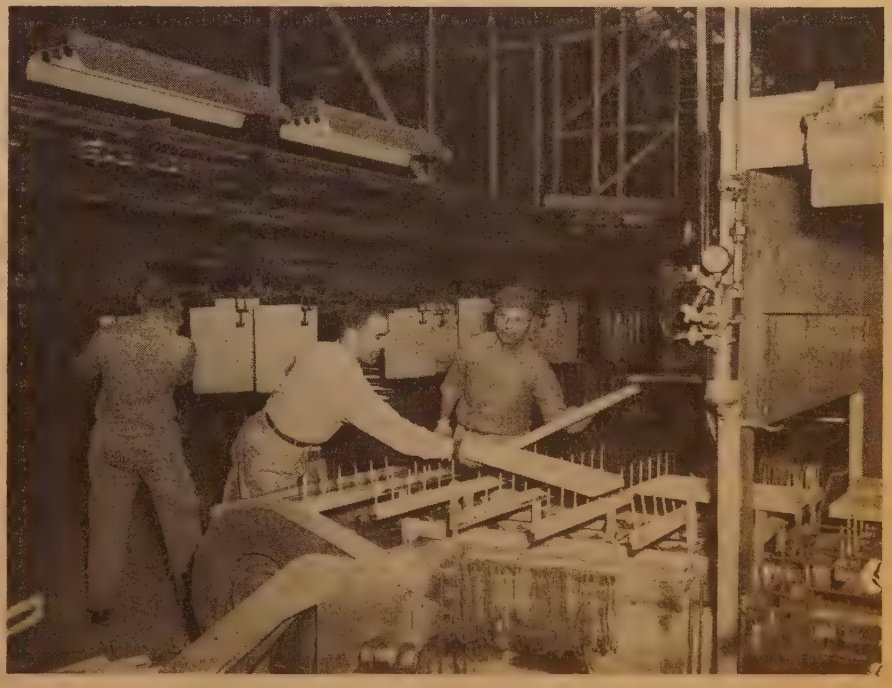
They knew what they wanted to make, and in what quantities, and they planed to expand and equip their plants accordingly. And inasmuch as they had to do a complete job of reconverting, anyway, they decided to modernize their facilities in every respect. They planned to spend at least $2,000,000 in redesigning and retooling, and of course, spent considerably more before the job was completed.

Visited Other Plants

When they had been asked to change over from a cast iron-sheet metal stove plant to a precision machine shop, they had visited the plants of many others to learn the best methods of doing such work. When they planned to modernize and re-equip their stove and furnace plants, they went out and visited the plants of many others to learn the best methods of doing such work. But in this case, they did not



Putting stove parts on pin-type conveyor to be automatically sprayed with ground coat.



Parts emerging from a continuous-type drying oven and being transferred to a conveyor.

Stove frames being welded on a merry-go-round.

stop with visiting other stove companies; they visited the most modern plants in many other industries, also. Executives, engineers, and department heads traveled all about the country, learning the most efficient methods of stamping, materials handling, welding, enameling, and so on. They then returned, pooled their ideas, prepared a complete new plant layout, bought machinery and equipment, and proceeded to equip what is now admitted, even by competitors, to be the most modern plant in the industry.

This newly-equipped plant was just getting into production at the time this was written. When it gets going full blast, it is expected that a stove or furnace unit will come off the assembly lines at the rate of one every 20 seconds, according to Arthur L. Blakeslee, president of the company.

While the company continues to operate its own foundry, the trend here, as elsewhere in the stove industry, is to use steel, in preference to cast iron, wherever possible. In the Kalamazoo range, for example, the only cast iron parts are the burners and the top grill; in the wood and coal stoves, the only cast iron parts are the firepot and the top, and even in the furnace, steel has replaced cast iron to a major extent.

Another major change for the better is in the substitution of welding for bolts and nuts. There are no bolts in either the frame or the enameled parts of a Kalamazoo range, but they are necessarily bolted together, because of the fact that porcelain-enameled parts are rather easily damaged. If such parts were welded to the assembly and even a minor one got damaged, it would be necessary to scrap the entire assembly.

Sheet steel is used in large quantity and numerous innovations have been introduced in handling and processing it.

Steel formerly was received in box cars and was unloaded manually and trucked. Now it is received in open gondola cars, which are brought right into the steel storage department, and the steel is unloaded and handled by a 10-ton crane. The craneway is 65 x 224 ft. and serves the entire storage area, as well as the scale and shears. The crane is operated by remote control. The steel used varies from 24 gage to 7 gage. Maximum requirements are four carloads a day.

As cars are received, they are unloaded by crane and taken immediately to an automatic scale which weighs each bundle and prints a ticket. The bundles then are taken to storage and stacked according to kind and size. Then as required, bundles are picked up by crane, taken to the scale and weighed out, then taken to a battery of big shears which are located in a line across one side of the storage department. After the required quantity of sheets have been sheared to their respective sizes, any remaining unsheared sheets are picked up by the crane, weighed back in, and returned to storage.

Large Presses Used

This plant uses few small shears, such as are used in most stove plants for cutting strips into blocks, preferring to use larger presses, instead, and to let the presses do such work at the same time they are forming the metal. When parts are to be blanked from full sheets without square shearing, sheets are taken out of storage by a lift truck, weighed out, and delivered to the press room. Sheared parts are placed in skid boxes and handled in the same way.

Square sheared parts are stored between the shears and the press room and materials flow in a straight line through it. When all presses have been installed, there will be two parallel lines of them, with a belt conveyor, 220 ft. long, running between the two lines.

Press equipment is exceptionally heavy for such a plant. Included are more than twenty presses of capacity ranging up to 625 tons. Many are equipped with pneumatic cushions and several are of the inclinable type. As many as five dies are used at the same time in some of the larger presses. Short, roller conveyors are located between the big presses.

All work flows straight forward through the press room either from press to press or, in the case of parts which require few operations, on the belt conveyor which takes all parts eventually to the washer immediately at the end of the line. Lots are run and dies are changed, of course, but there is no running of a given part on one press, then changing the die and running the same part through the same press again. Lots run range from about 3,000 to 6,000, depending on the end product, so there is a minimum of down time for changing dies.

Some of the press operations are unusual; in fact, some of them are said to be more difficult than those found in many larger plants, in other industries. The range top and backguard, for example, is formed from a single sheet and requires 17 press operations. These operations are: Rough blank, draw, form backguard 90 deg., wipe rear corners, cam trim all around, form offset, cam flange left side, cam flange right side, flange front, flange back, pierce burner opening, flange burner opening, pierce, offset and emboss, pierce flue opening, flange flue-

opening, pirece name-plate hole, pierce backguard flange.

All pressed parts are conveyed through a washer, 48 ft. long, where they are washed in a solution which removes all draw compound, then dried.

Emerging from the washer, parts are placed on carriers on an overhead, chain conveyor, 3,310 ft. long, which is used both as a transfer conveyor and for storage purposes. This bank of parts, which is kept ahead of the enameling department, and another of about 8,000 parts in a storage department near the final assembly lines, are the only ones carried, and they are by no means excessive.

This conveyer is equipped with 415 carriers, each of which is 40 by 60 in. and has five shelves. Shelves are of various heights, to accommodate parts of different sizes, and each part is placed in a certain position, on a certain shelf. At the washer, and also at the pickling machine, there is a "turn-around" device, consisting of an arm projecting from the I-beam track which engages the carriers and turns them around for the convenience of workers in loading or unloading the carriers. After passing such a station, the carriers are turned back in their former position by a similar device.

This conveyer, which can carry a load of 176 tons, conveys parts from the washer in the press room to the welding department, to pickling, to enamel, then to the stores department on the second floor, where purchased parts are loaded on it, then down to the final assembly department and back to the press room. When it arrives in the welding department, the conveyor comes down and the carriers travel along in a trench to bring them to proper working level, because welded parts are placed on the top shelf on them and nowhere else.

Welding Processes

Welding of many sub-assemblies is done on either side of the conveyor. Four types of spot welders are used; standard, rocker arm type, projection type, guns of the pressure type, and guns of the push type, depending on the location of surfaces to be welded. All welding is electronically controlled to insure uniformity and avoid damage.

In this department is a double oval track conveyer on which the stove frames are assembled. Gas ranges are assembled on one side and combinatioin ranges on the other. There is a common return, consisting of a powerized belt conveyer, between the two. Each side is about 75 ft. long and consists of a roller conveyor on which are mounted eight framing jigs. Sub-assemblies having been formed and welded previously, the front, sides, ends and back of a range frame are placed in a jig and are welded together in it by means of gun welders. Each worker performs only certain operations, hence the men become specialists, while uniformity of product is assured by the method

ASSEMBLY LINE OPERATIONS ON THE GAS RANGE ARE AS FOLLOWS:

Station #1.	Place in wire with switch and receptacle for oven light.
Station #2.	Place on rollers, with range on back.
Station #3.	Place on tinnerman nuts.
Station #4.	Place oven insulation.
Station #5.	Place in oven.
Station #6.	Place on oven front.
Station #7.	Place on crate bottom.
Station #8.	Place on end panels.
Station #9.	Place on manifold assembly.
Station #10.	Place all burner assembly.
Station #11.	Place in lighter with flash tubes.
Station #12.	Place in heat shield insulation and heat shield.
Station #13.	Install oven burner baffle and oven bottom.
Station #14.	Install oven light lens and snap ring.
Station #15.	Install and fit oven door assembly to frame.
Station #16.	Install all storage drawer assembly; install broiler drawer assembly
Station #17.	Install rangetop and drip trays.
Station #17A.	Place on name-plate.
Station #18.	Install oven burner baffle, oven bottom, and oven racks.
Station #19.	Place assembly of vent grill in oven, place aeration bowls in oven, place gas top grates in oven.
Station #20.	Place on gas cock and thermo handles.
Station #21.	Tape range and place on stickers.
Station #22.	Finish crating range and bolt to crate.

Crating the stoves as they reach the end of the assembly line.

Automatic pickling tank for treating parts to be enameled.

of assembly. Small parts which do not go into the frame, but which are to be enameled, are placed on the transfer conveyer and taken to the enameling department, then to their respective stations on the final assembly line.

Frame assemblies are taken from the oval-track welding conveyer and hung on a paint conveyer, 2,400 feet long, which takes them, together with miscellaneous small parts which do not have to be enameled, to a japanning room. The japanning machine consists of a three-stage spray wash, three-stage bonderite, a dry-off oven, a paint dip tank, a paint drain area, and a paint baking oven on the second floor. Parts loaded on the japanning machine conveyor are not touched again until they are taken off in the assembly department.

Another overhead chain conveyor, called the "B" conveyor, 2,158 ft. long, starts at a receiving dock, goes up to the stores department on the second floor, thence to the enameling department, where it picks up enameled parts, then to the sub-assembly department and on through the final assembly department. Suspended from it are three-deck carriers which are equipped with rubber-tired casters. On arriving at a work station where the parts on it are to be used, a carrier is disengaged from the conveyor and retained there until the parts are used up in assembly operations. Meanwhile, an empty carrier is wheeled in position beneath the conveyor, where it comes down, and a hook on the conveyor chain picks up the empty carrier automatically. About 800 such carriers are required to supply both the conveyor and the assembly lines.

In the enameling department, parts first are removed from the conveyor and suspended from arms on an automatic pickling machine which takes them through the process at a rate of 90 arms per hour. These arms are raised and lowered automatically to dip the parts in two hot cleaner tanks, water rinse, acid cleaning tank, another water rinse, nickel salt tank for bond of ground coat, through another water rinse, a neutralizer tank, and a gas-fired dryer.

Parts then are removed and placed on a pin-type conveyor which takes them through the ground coat enamel. This is said to be one of the very few plants in the country which sprays the ground coat automatically. The method not only is faster, but it is said to produce a much better and more even finish. Here the ware is placed on the conveyor pins upside down and passes through an automatic spray booth, then through two booths in which edges are sprayed by manually-operated spray guns, then the ware is turned face up and sprayed in a second automatic spray booth and in other hand booths for spraying edges, then through a dryer. It is then hung on a ground coat furnace chain and burned in a gas-fired, continuous-type oven.

The ware then is taken off and hung on a storage conveyor, about 690 ft. long, for the white coat. The latter is applied by automatic spray and hand spray, as above, in an air-conditioned spray line. It then goes through a dryer and a space reserved for a brushing section. It is then put on a furnace chain and baked in another continuous oven, after which it is sent through an inspection light tunnel to detect any off-color or other defects.

Parts which do not require finish coat porcelain enameling are stipled by hand spray guns, after the ground coat has been applied.

Porcelain enameled parts which are accepted are placed on the "B" conveyor carriers, described above, and taken to the final assembly department. Rejects are placed on the storage conveyor and returned to the white line for reworking.

At maximum capacity, the pickling department, ground coat spray line, and ground coat furnace will run three shifts; the white cover coat steel spray line and furnace will run two shifts. The third shift will run cast-iron parts.

Enamel room frits and supplies are taken by hoist from the receiving dock to a millroom on the second floor. The enamel is then fed to mills on the first floor by means of hoppers and is ground to proper fineness. It is then run through a magnetic separator to remove all iron which contaminates the enamel and causes rejects. After milling, the enamel is pumped back to the second floor for storage in containers to be piped to the enameling department as required. About 12,600 pounds of enamel are used daily. A laboratory and a control room adjoin the millroom.

Cast iron parts are brought by truck-trailer from the foundry, processed, and sent to the assembly department. Some of them have to be drilled and tapped, all have to be cleaned, some are sprayed and baked, others are japanned by the machine described earlier.

Stove frames and miscellaneous japanned parts are brought to the assembly department by the japan conveyor; black enameled parts, white enameled parts and purchased parts are brought in by the "B" conveyor. All parts are delivered at their respective work stations on the lines.

There are two final assembly lines, running parallel with each other. Each is in the shape of a long-legged letter "U," and each is about 590 ft. long. Both are 36-inch slat conveyors. One is used exclusively for assemblying gas ranges, the other for combinations and all other units except furnaces.

When a range leaves the final assembly line, it is crated and ready for shipment. It is then transferred to a slat conveyor, 530 ft. long, which takes them upstairs and across a bridge over a railroad track to the shipping department.

SURVEY OF THE MONTH

How Are PORTAL-TO-PORTAL CLAIMS Affecting Industry?

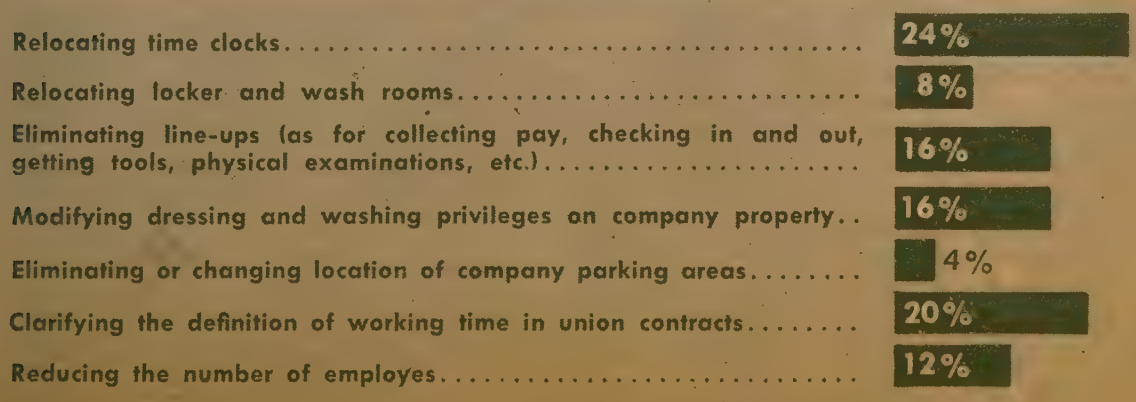
This MILL & FACTORY survey, made among all types and sizes of manufacturing companies, endeavors to learn how widespread these claims are to date, and asks company executives how portal-to-portal claims are affecting their firms.

THE SURVEY SHOWS:

1. That 4% of the respondents are being sued for portal-to-portal pay.
2. Of the respondents planning to take steps to reduce portal-to-portal time, 24% will relocate time clocks; 8% plan to relocate locker and wash rooms; 16% will eliminate lineups; 16% will modify dressing and washing privileges on company property; 4% will eliminate or change location of company parking areas; 20% will clarify the definition of working time in union contracts; 12% will reduce the number of employes.
3. Over 50% of the respondents are foregoing any planning at all until the portal-to-portal issue is clarified by the courts or Congress.
4. Only 2% of the respondents are endeavoring to reach an out-of-court settlement of the portal-to-portal claims.
5. If portal-to-portal claims against their companies were settled at one-half the asking figure, 62% of the respondents would reduce their plans for future expansion; 44% predict a reduction in employment; 18% predict bankruptcy, and 31% would reopen government contracts to take care of paying off claims.

1. Is your company being sued for portal-to-portal pay?

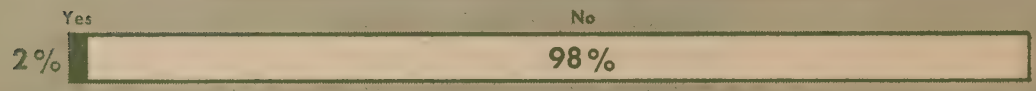
2. What steps, if any, are you planning to reduce portal-to-portal time?


Relocating time clocks..... 24%
Relocating locker and wash rooms..... 8%
Eliminating line-ups (as for collecting pay, checking in and out, getting tools, physical examinations, etc.)..... 16%
Modifying dressing and washing privileges on company property.. 16%
Eliminating or changing location of company parking areas..... 4%
Clarifying the definition of working time in union contracts..... 20%
Reducing the number of employes..... 12%

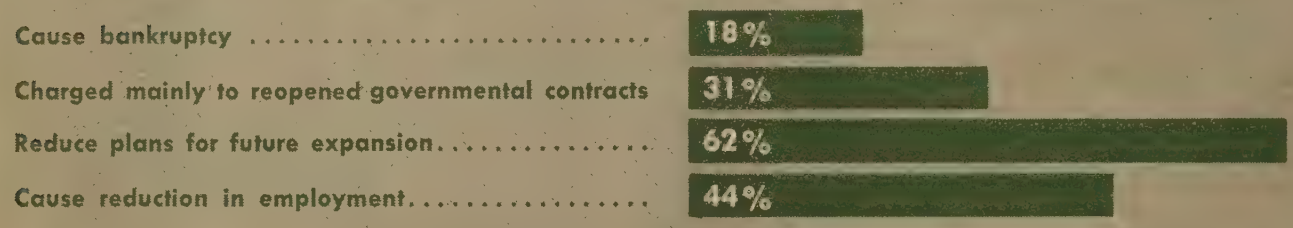
Note: 17% of the respondents answered question No. 2

3. Are you foregoing any planning at all until the portal-to-portal issue is clarified by the courts or Congress?

4. Are you endeavoring to reach an out-of-court settlement of the portal-to-portal claims?



5. If the portal-to-portal claims against your company were settled at one-half the asking figure, how would the financial structure of your company be affected?


Cause bankruptcy 18%
Charged mainly to reopened governmental contracts 31%
Reduce plans for future expansion..... 62%
Cause reduction in employment..... 44%

Note: these percentage figures do not add to 100% because many respondents checked two or more factors.

Comments from Respondents

"If we had a large organization, we would certainly do what is possible to arrange for time clocks, wash rooms, dressing and washing to be done outside of the company property, on adjoining premises, owned otherwise privately, with a charge for their use."

New England food manufacturer.

"We have a United Mine Workers contract and have worked it out by allowing them 10 minutes in morning and 10 minutes at night to change clothes and pay clock punch for the shift; anyone leaving the job before the 10 minute period *fires himself* and they know it. No more trouble after 15 were fired."

Southeastern chemical manufacturing company.

"It should be outlawed."

Mid-West electric manufacturing company.

"Should employes be paid for time starting with the hour at which they arise before starting to work?"

New England manufacturing company.

"Congress should make the labor unions responsible for their actions the same as any corporation or company and we would not have this kind of damn foolishness."

Eastern manufacturing company.

"Not by cash, but by a quid pro quo in equivalent time off to each employe affected, subject, of course, to the maintenance of smooth operating efficiency."

Eastern small parts company.

"They are ridiculous and should not be paid. I don't believe the unions expect them to be paid but are using them as a bargaining point."

Mid-West machinery manufacturer.

"A one year statute of limitations made retroactive to all pending litigation. Work week should be defined; definition should be so drawn as to define 40 hours work week and mean what everyone thought it did mean."

New England manufacturing company.

"A vicious thing emanating from Lewis and seized by CIO as a desperate buildup."

Mid-Eastern coal company.

"The 'DeMinimus' factor in the Supreme Court decision should be clarified so that suits for trifles are not permitted. Retroactivity should be limited."

New England small parts manufacturer.

"If ever three minds were in agreement (employer, employe and union), it was their understanding where work began and wages started. Portal-to-portal is a windfall no one is entitled to. Congress and the courts should straighten it out."

New England manufacturing company.

"Supreme Court should reserve the error it made in sustaining the original lower court decision."

Mid-West paper manufacturing company.

"No claims allowed. Practice in effect in each company at time Fair Labor Act was passed to be standard for that company."

Southern manufacturing company.

"By Congress restating the intent of the Wage & Hour Law; hours worked to mean productive hours . . . Have always allowed employes to be 7½ minutes late reporting to work without any deductions."

Southern lumber manufacturing company.

A. N. Wecksler,
Washington Editor

Current Government view is that the much-publicized ***"recession" will be mild*** . . . . Prices will come down gradually, but the overall price level will remain high.

So will wages, and with wages up, purchasing power will be sufficient to ***take away the products of industry.*** Food prices will have to come down appreciably for this formula to work.

Wage increase will have to be moderate — not more than ***5% on a national average.*** Manufacturing wages may average up by 7% without upsetting the economic applecart, according to these Government economist observers. The powerful unions would get the lion's share of this increase.

These higher wages would have to come out of industrial ***operating economies and/or profits*** . . . most likely from profits of distributors in consumer goods lines, rather than from manufacturer and industrial distributor margins.

National income is due to drop off, reflecting primarily the cut in prices. Income of the average worker will tend to increase.

These adjustments will take place within the next six months, and by the end of the year, the economy will have again achieved a balance. By then there will be a ***normally competitive market,*** with the possible exception of housing.

Only reservation offered in these predictions is the ***possibility of strikes,*** that could and would upset the trend toward lower prices. ***Strikes would keep prices high*** . . . would reduce the income for this year of large masses of workers, and create an artificial scarcity that will tend to firm up both industrial prices and agricultural prices.

The general view held by union leaders at this time is that a strike in a basic industry would be ***disastrous to the case of organized labor,*** and would touch off popular support for some of the most restrictive of the legislative proposals now before Congress.

While much of the "Economic Report of the President" has been taken as being in support of the need for higher wages, one very significant paragraph has been generally overlooked. This paragraph reads as follows:

"The rise in prices that occurred in the latter half of 1946 greatly ***reduced the purchasing power*** of the current incomes received by the large majority of people. It is true that some groups in the population received increases in income that for them balanced or more than balanced the rise in prices. But the large mass of consumers did not enjoy such offsets. How to effect a ***mutual adjustment of incomes and prices*** which will provide purchasing power adequate to sustained maximum production in the years ahead thus becomes a central problem for private enterprise and Government."

Obviously, the groups in the population which received increases that more than balanced the rise in prices were the ***unions in key industries,*** which were able to force a maximum wage payment by threat of strike. Those who lost ground were the ***less strategically placed workers*** and white collar employes, to whom the percentage increase meant less money in terms of a higher wage—and a sharp cut in purchasing power.

In other words, the wage increases in 1946 ***benefited the few at the expense of the many.*** The complete realization of this basic economics has begun to trickle down, and will dissipate any public support of another round of strikes.

The public did not become highly aroused during the strike waves of last year. A repetition would be more likely to develop great ***public resentment against unions.***

Employment, excluding agriculture, hit an ***all-time high*** during the last two months of 1946, exceeding even the wartime peak reached in December, 1943. The seasonal employment surge was followed by a decline, but on the whole, the peak levels which have prevailed for the last six months are being maintained.

Two indexes of vital importance in determining the employment outlook both show a ***solid demand for labor***—which, if accurate, mean that the tight labor market is due to persist for at least the next several months.

The United States Employment Service, which maintains offices in practically every industrial community, reports that there is no change in the demand picture . . . that employers are still requiring additional workers to meet their ***high turnover rate.***

The other index is the number of new initial unemployment compensation claims. Officials analyzing these claims state that the volume of claims has not increased markedly—and that there has been ***no major lay-off period,*** even after the holiday peak employment period ended.

Employment of sales and service workers in wholesale and retail establishments is inter-related with the level of employment in industry. Where the market for goods is expanding, there is a requirement for both production workers to make the goods, and sales people to handle the merchandising.

Business Structure Division, of the Office of Business Economics, of the Department of Commerce, reports that the ***demand of retailers for replacement*** merchandise is greater than can be filled by manufacturers.

Reason is that the stores are virtually liquidating their war and immediate postwar stocks of merchandise—and are seeking to replace these goods with ***quality merchandise in moderate price lines***.

The demand for these lines of goods is greater than can be filled by manufacturers, and it will be several months before retail stores complete the replacement of the inventories which they liquidated during the Christmas selling season.

Actually, the volume of goods moved during the 1946 Christmas season equalled that of the preceding holiday season—with the ***dollar value running at about 20% higher*** than in 1945. The reason for the increase in dollar value was the higher price level.

When this trade situation is translated back into production workers needed to produce the inventory replacement, it adds up to ***continued high industrial employment*** levels.

The problem is primarily one of working off such high-cost lesser quality inventory as may still be in the cycle of distribution from manufacturer to consumer. The sharp markdowns in prices of such goods have not greatly jeopardized the profit position of the seller, according to the Business Structure Division, as the original markup on these goods was sufficient to accommodate a healthy cut without resulting in a net loss.

Tactical blunders which did the most to ***alienate public sentiment from union*** organizations were the Lewis defiance of court procedure in precipitating the coal strike, and the portal-to-portal pay issue.

The coal strike was an out-and-out labor dispute, in which Lewis failed to gage the extent to which the public had become fed up with union machinations. Significantly, the CIO attempted to show the solidarity of labor by backing the Lewis defiance of court jurisdiction.

The portal-to-portal issue is an example of how a ***union strategy backfired***. The CIO strategy was to build up the portal issue dollar-wise, and to exercise the large claims as a bargaining weapon. However, the ***claims mushroomed out of hand***, and the public reacted sharply against the unions.

Again, significantly, the AFL failed to reciprocate the cavalier gesture offered by the CIO in the coal crisis. AFL President Green ***backed off from the portal issue*** when the public reaction showed itself to be clearly in opposition.

CIO is now trying desperately to get off the hook. The union leadership which initially sponsored the portal-to-portal suits would like to see Congress make a probe of so-called non-productive working time in industry.

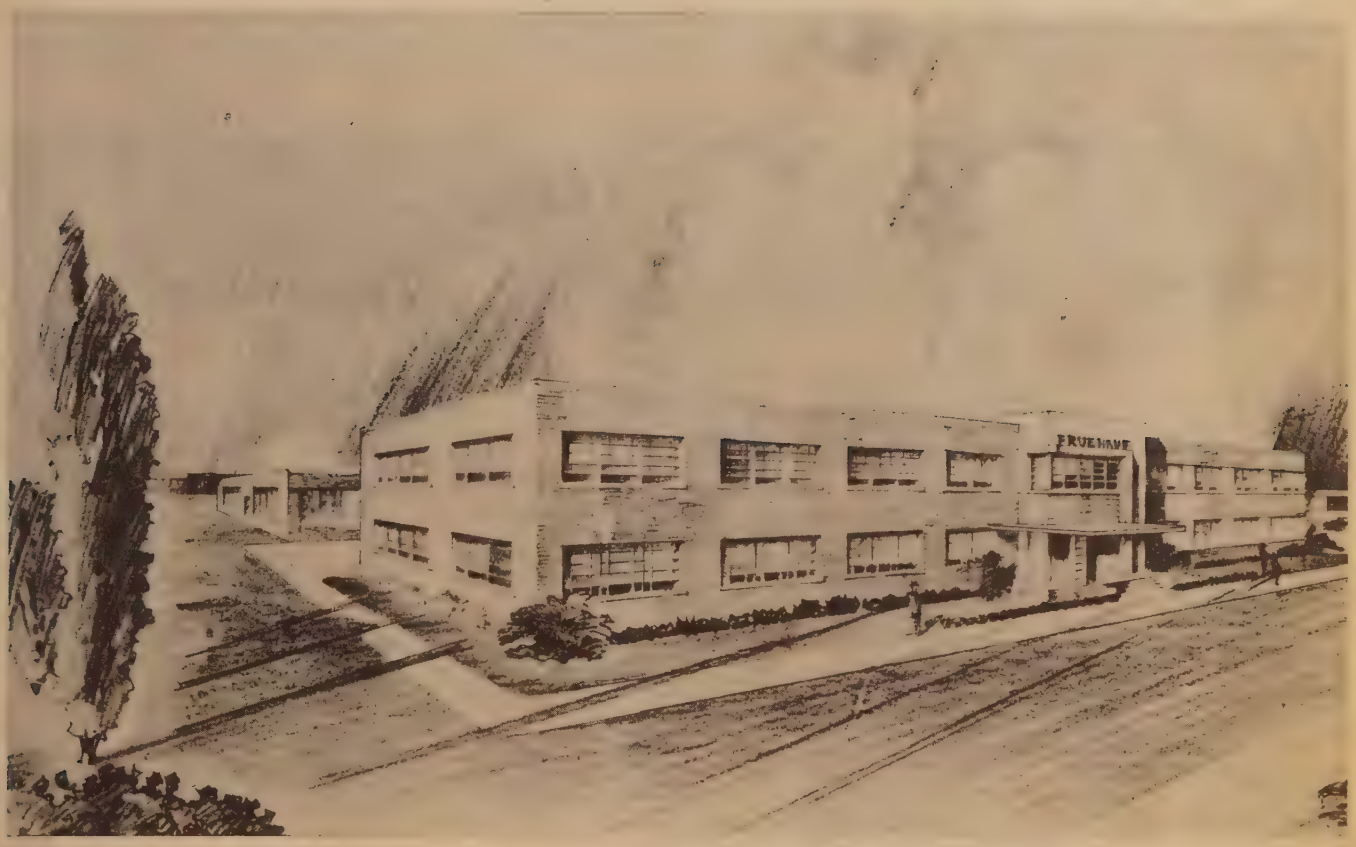
The purpose of seeking such a probe is to ***delay Congressional*** action looking toward the revision of the Fair Labor Standards Act—and possibly provide some loophole through which the CIO could retreat from its extended position on the portal issue.

MILL & FACTORY

"Industry's Know — How Magazine of Management, Maintenance and Production"

205 East 42nd Street New York 17, N. Y.

The World's Largest Trailer Plant



Artist's conception of the office building section of the new plant.

BRIEFED: This new Fruehauf trailer plant is the last word in design and layout for building trailers by large scale production methods. The normal production rate of this plant will be 50 complete trailers every 8-hour shift. The plant is fully conveyorized and incorporates numerous improvements designed to simplify the building of trailers and trailer parts.

INDICATIVE of the business outlook as its management sees it, the Fruehauf Trailer Company, Detroit, is building a complete new plant which, when completed early in 1947, will be the largest and most modern truck-trailer plant in the world.

This new plant will not replace any other facility, Harvey Fruehauf, president, said. Instead, it will increase the capacity of existing Fruehauf facilities by an estimated fifty complete trailers every eight-hour shift. It will be devoted to the manufacture and assembly of standard, production line trailers, while the Detroit plant, which has been the principal manufacturing facility heretofore, will be devoted to custom-built trailers. Other Fruehauf assembly plants are located at Los Angeles, Kansas City, Omaha, Springfield, Missouri, Fort Wayne, Indiana, and Toronto, Ont. There is also a central machine shop, located at Cedar Rapids, Iowa.

Located at Avon Lake, Ohio, eight miles east of Lorain and 22 miles west of Cleveland, the new plant consists of a manufacturing and assembly building, office building, personnel building, shipping building, power house, and supplementary facilities.

The main manufacturing and assembly building is 2,253 feet long and is 400 feet wide except for a short section at the north end of it. The total floor area is approximately 850,000 sq. ft. It extends north and south, with the office and personnel buildings on the east and the shipping building and power house on the west side.

It is steel frame and Robinson insulated steel construction, with continuous steel sash in sidewalls. Outer walls are of corrugated sheet steel, while inner walls are of flat sheet steel, with insulation between outer and inner walls. Both of the latter are painted aluminum. Footings are of concrete and rise 1′ 6″ above

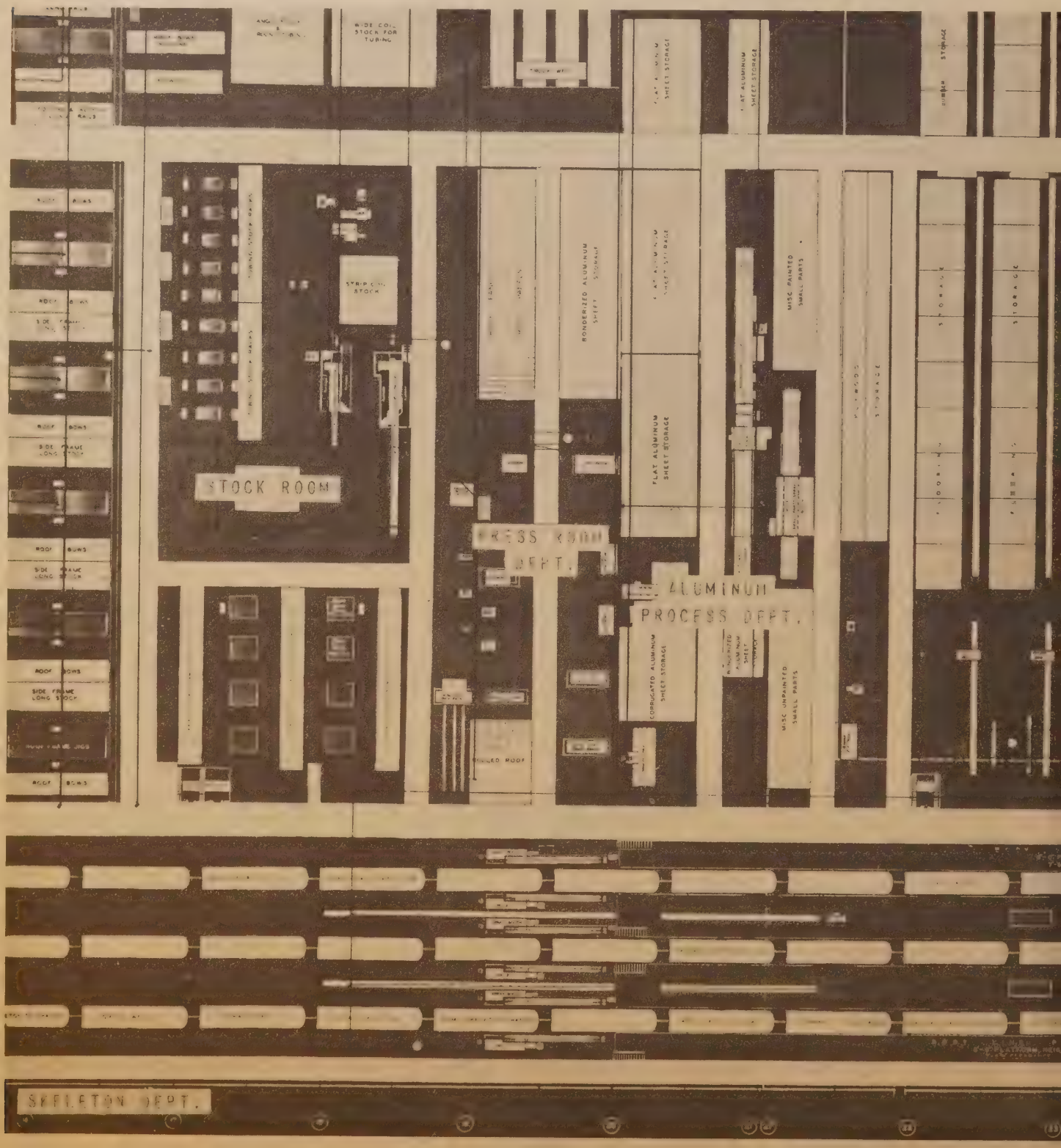
ground. Above this is the insulated steel wall to a height of 8′ 6″, sash 8′ 1″, a header, and another row of sash, 5′ 5″ high, then insulated steel siding to the roof. Head clearance to the trusses is 22′. Bays are 50′ x 64′.

Three monitors, with continuous steel sash, power operated, extend the entire length of the building. The roof construction is gypsum. Floors are concrete.

Materials and supplies are received on the west side and flow east across the plant, through the various processing and sub-assembly operations, to the final assembly lines, which extend the entire length of the building on the east side.

Principal departments, from south to north, and their approximate areas are: Frame assembly, 112,000 sq. ft., chassis assembly, 80,000 sq. ft., body skeleton department, 72,500 sq. ft., body sub-assembly, 146,300 sq. ft., body assembly, 45,000 sq. ft., paint and body modification, 96,000 sq. ft., and carbon steel corrugated trailer department, 38,400 sq. ft. Receiving areas total approximately 84,000 sq. ft.

There is a completely-equipped maintenance department near the north end, where it occupies some



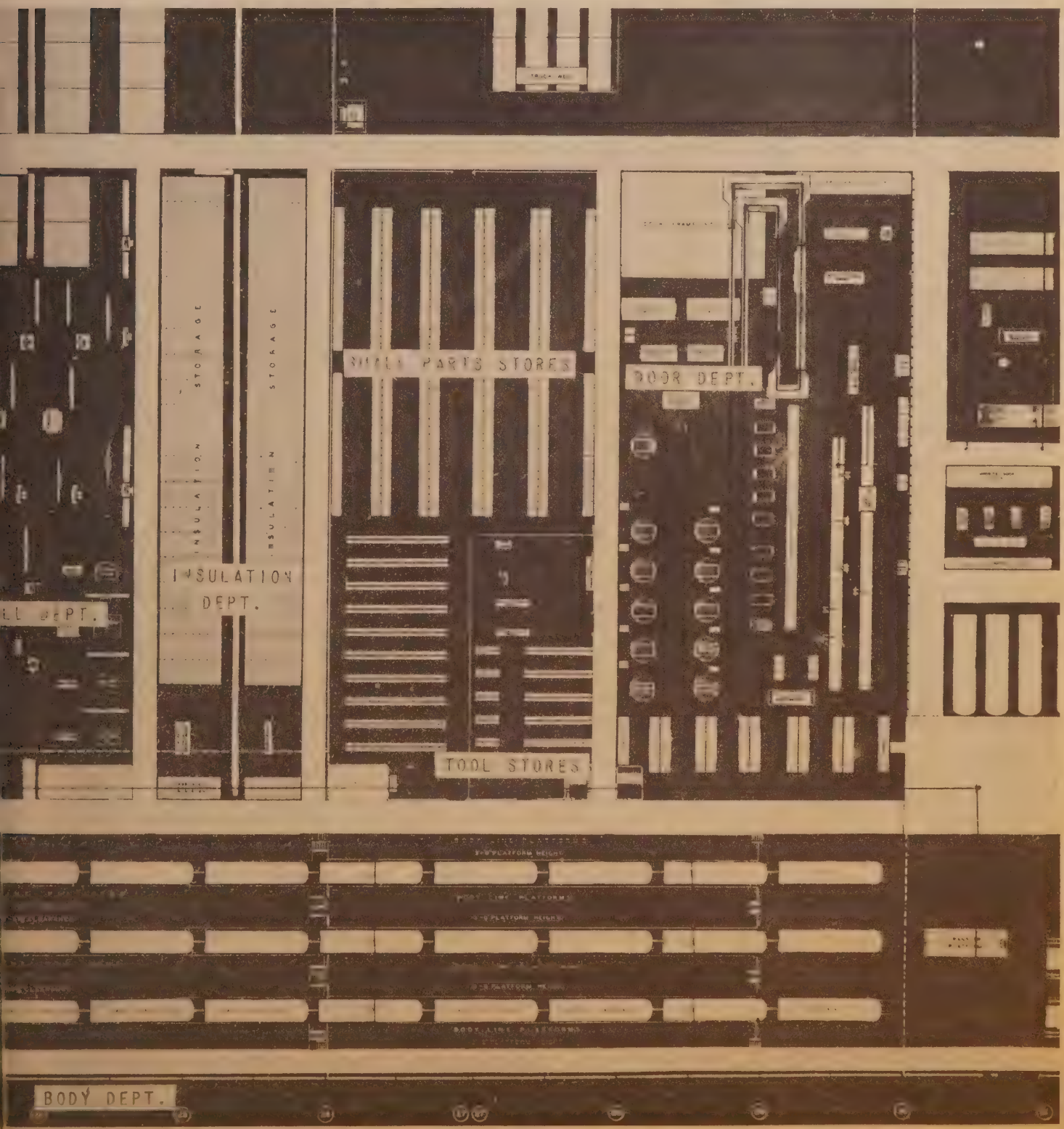
27,000 sq. ft. of floor area. This department not only will take care of all plant maintenance, but will also be responsible for keeping a large number of motor vehicles in operation.

Receiving Facilities

A depressed railroad track enters the plant at the south end and extends all the way through it, along the west side, emerging at the north end. In addition, there is a spur track, about 850′ long, along the outside of the building which enters it and connects with the inside track at the 17th bay. This arrangement saves much interference by switching operations, as cars can be pulled from the far end of the inner track without disturbing those on the near end of it, and vice versa.

There are also six truck wells, each 50′ wide, located at intervals along the west side of the plant, with receiving and storage areas between them, so that parts, materials, and supplies which are brought in by truck can be received at the points nearest to those where they are to enter production.

Serving the receiving areas are a 3-T and a 5-T crane, while the lat-



ter interlocks with a system of 38 cranes which serve the entire plant. These are all of the interlocking type and are operated by an automatic dispatching installation which makes possible the lowering, raising, and dispatching of any load by means of remote control and without personal contact. In general, these cranes serve the sub-assembly departments and convey sub-assemblies to the final assembly lines. They vary from 1-T to 3-T capacity.

There are also six overhead chain conveyors, four of which are powerized, and several powerized floor conveyors, besides a large fleet of industrial trucks. All of the chain conveyors are No. 458 chain.

First of the powerized overhead conveyors is 476′ long and serves the tire and rim storage, conveying tires and rims from storage to assembly.

The second is 660′ long and handles the complete assembly of tire, rim, hub, and brake drum from subassembly to final assembly. At both loading and unloading stations, this conveyor dips down and hooks on to automatically engage the carriers, or disengage them, as the case may be.

The third line is 192′ long and takes spot-welded door frames from the welding machines to welding fixtures in which the framing operations are completed.

The fourth is 522′ long and is used to convey metal door frames through a degreaser, then through an automatic dip paint tank, then on to the assembly of outer door panels.

There, door frames are placed in fixtures on an oval conveyor which is a combination of the roller and monorail types. They are first placed in a horizontal position on the first leg of the roller conveyor and the outer door skin, hinges, cam lock brackets, etc., are installed. In other words, the top side is completed. Then the assembly, in the fixture, is pushed up on a U-shaped monorail section for some vertical operations, then on around to the return roller section, where the assembly is turned over and the inner side of the door is completed. Stationed along the roller conveyor sections are six radial-type drill presses, five of which are equipped with multiple drills. The sixth has a multiple head. Also along the same sections is a bus bar from which are suspended many hi-cycle tools, used for nut-running, screw-driving, and related operations. There are about 30 fixtures on this conveyor.

This department will supply complete doors not only for this plant, but also for all other Fruehauf plants, the idea being to concentrate the work in one place to justify the installation of the mechanical equipment described.

The same principle is being applied to the production of square tubing, which previously was purchased. This plant will roll about 90,000′ of such tubing daily for body skeleton frames built in all Fruehauf plants.

Final Assembly

The final assembly lines are of the drag-chain type and are elevated, where necessary, to working height.

First are two parallel lines, each 186′ long, for assembling the chassis in an up-side-down position. One line is for single-axle jobs, the other for gravity torsion tandem. Some of these chasses are as much as 40′ long. They are handled here by cranes.

On arriving at the end of the chassis assembly line, they feed automatically into a power-operated, combination turnover and transfer fixture which turns them right-side-up and diverts them to three body assembly lines which continue on in the same direction as the chassis lines for 775′. Here the assemblies are pulled along on their own wheels by drag-chain conveyors while the skeletons are assembled, skeleton and chassis are painted, side panels, roof, flooring, interior lining, molding, doors, hardware, etc. are installed. Parts and materials for these three lines are brought to them by a "Monostock" crane system, cab-operated, and are stored along them.

The trailers then feed into another automatic transfer station and are diverted from the three body assembly lines to two paint lines, each 635′ long, where they are sprayed with a primer coat, dried, finish-painted, and baked as they proceed. Spray booths all are of the water-wash type. Ovens are heated by high-pressure steam.

On reaching the end of the paint line, completed trailers are given a final inspection, brakes are tested, and they are then ready for shipment.

The shipping building is 67 x 218 feet and is of the same type of construction as the main assembly building, except that the overhead clearance is 30′. It is served throughout by a 10-T crane which is used to set the trailers on flat cars while they are in motion. It is also equipped with a cable-type car-haul system, operated by a 25 h.p. motor, which is capable of pulling 28 flat cars, each fully loaded, at a speed of 25 f.p.m. Flat cars are lined up on a track which enters the building at the south end and are pulled into it by the car-haul. As they come along, the crane sets the trailers on them, men tie the trailers down, and the cars then roll on out the north end by gravity into a storage yard which is capable of holding an entire day's production.

Office Building

The office building is located on the east side of the factory. It is 44 x 162 feet, has two stories and basement, and is built of brick. Floors are of the Robertson Q type, with asphalt tile finish.

Between the office building and the factory, and connected with each by an enclosed corridor, is the personnel building, which is 96 x 263 feet and is a single-floor structure of the Robertson insulated metal type. In addition to the personnel department, this building houses a kitchen and cafeteria, central locker room and wash rooms, and a completely-equipped hospital. The hospital area includes wards for both men and women, general treatment room, diathermy, X-ray, urinalysis laboratory, special units for eye injuries, and even an operating room.

Employes enter the plant through the central locker room and the corridor from the personnel building to the factory. A central clock room is housed in this corridor.

The power house is of steel frame and Robinson insulated metal construction and is 44 x 132 feet in size. It houses three high-pressure boilers, two of which are of 45,000 lbs. capacity, the other, 60,000 lbs., together with two air compressors, each of 1345 c.f.m. capacity. The boilers are oil-fired.

Water is obtained from the Avon Lake city system.

Power is brought in from the public utility lines, through a 4,160 v source, and is distributed through three 3,000 kva substations which are located in the plant.

Power and lighting are on separate circuits

There are 12 substations in the lighting system, each of 200 kva capacity. Lighting units include both fluorescent and incandescent types, the former being used chiefly in the assembly areas. Fluorescent units consist of two 100 w tubes in each fixture, while incandescent ones consist of either 300 or 500 w lamps in Holophane reflectors.

The parking lot has ample room for upwards of 2,000 trailers.

Where Does That Decimal Go?

By Daniel H. Spofford
Hillyer Junior College

THE majority of people today using slide rules often have to guess where to place the decimal point. The decimal point is just as important as a whole number i.e.: It is just as correct to say that 2 x 2 = 5 as it is to say that 2 x 2 = 40.

In a manual published by one of the largest manufacturers of slide rules there is the following statement: "The decimal point is placed in accordance with the result of a rough calculation". Although this statement is correct, as several people do it that way, it should not be a rule to follow.

A recent book published on time study uses another and much more complicated method for determining the decimal point. This method goes into the addition and subtraction of positive and negative characteristics, the use of logarithms, etc. The layman is not familiar with these terms and it only tends to confuse him, particularly when decimal numbers are used with negative characteristics.

A simple method of determining where to place the decimal point in multiplication and division using the C and D scales is shown below:

Consider the number

3000 as having	4 digits
300 as having	3 digits
30 as having	2 digits
3 as having	1 digit
.3 as having	0 digit
.03 as having	—1 digit
.003 as having	—2 digits
.0003 as having	—3 digits
etc.	

Rule No. 1. When multiplying and the slide projects to the LEFT, there will be as many digits in the answer as there are digits in the numbers being multiplied.

Example: 30 x 400 = 12,000. [2 digits + 3 digits = 5 digits.]

Rule No. 2. When multiplying and the slide projects to the RIGHT add the number of digits being multiplied and SUBTRACT 1 for every RIGHT projection, to get number of digits in answer.

Example: 30 x 300 = 9,000. [2 digits + 3 digits — 1 right projection = 4 digits.]

Example: 30 x .0003 = .009. [2 digits — 3 digits — 1 right projection = —2 digits.]

Example: 20 x .2 x .02 = .08. [2 digits + 0 digits — 1 digit — 2 right projections = —1 digit.]

Rule No. 3. When dividing and the slide projects to the LEFT, subtract the number of digits in the lower number from the number of digits in the upper number to determine number of digits in answer.

Example: $\frac{350}{7} = 50$

[3 digits — 1 digit = 2 digits.]

Example: $\frac{35}{.07} = 500$

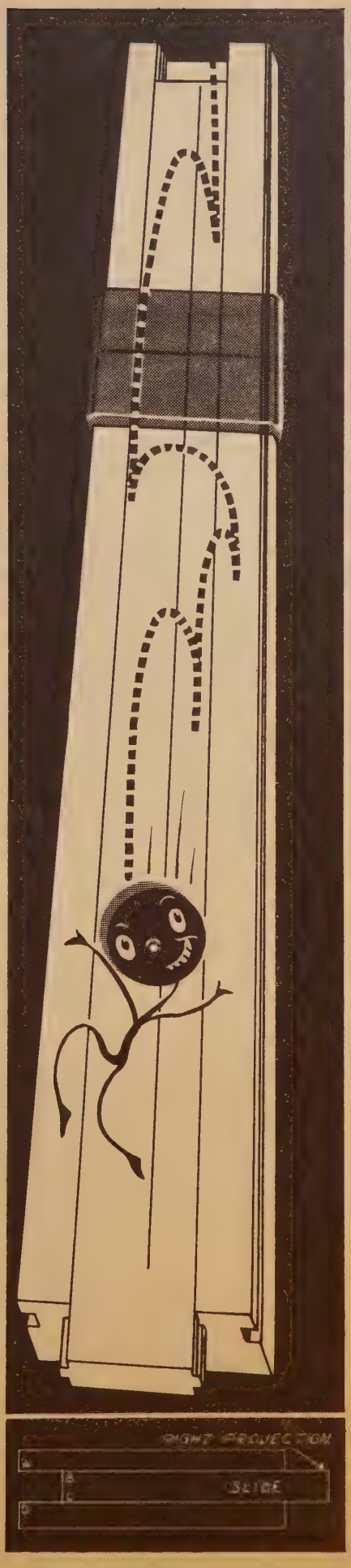
[2 digits — (—1) digits = 3 digits. Note: (— —1 = +1).]

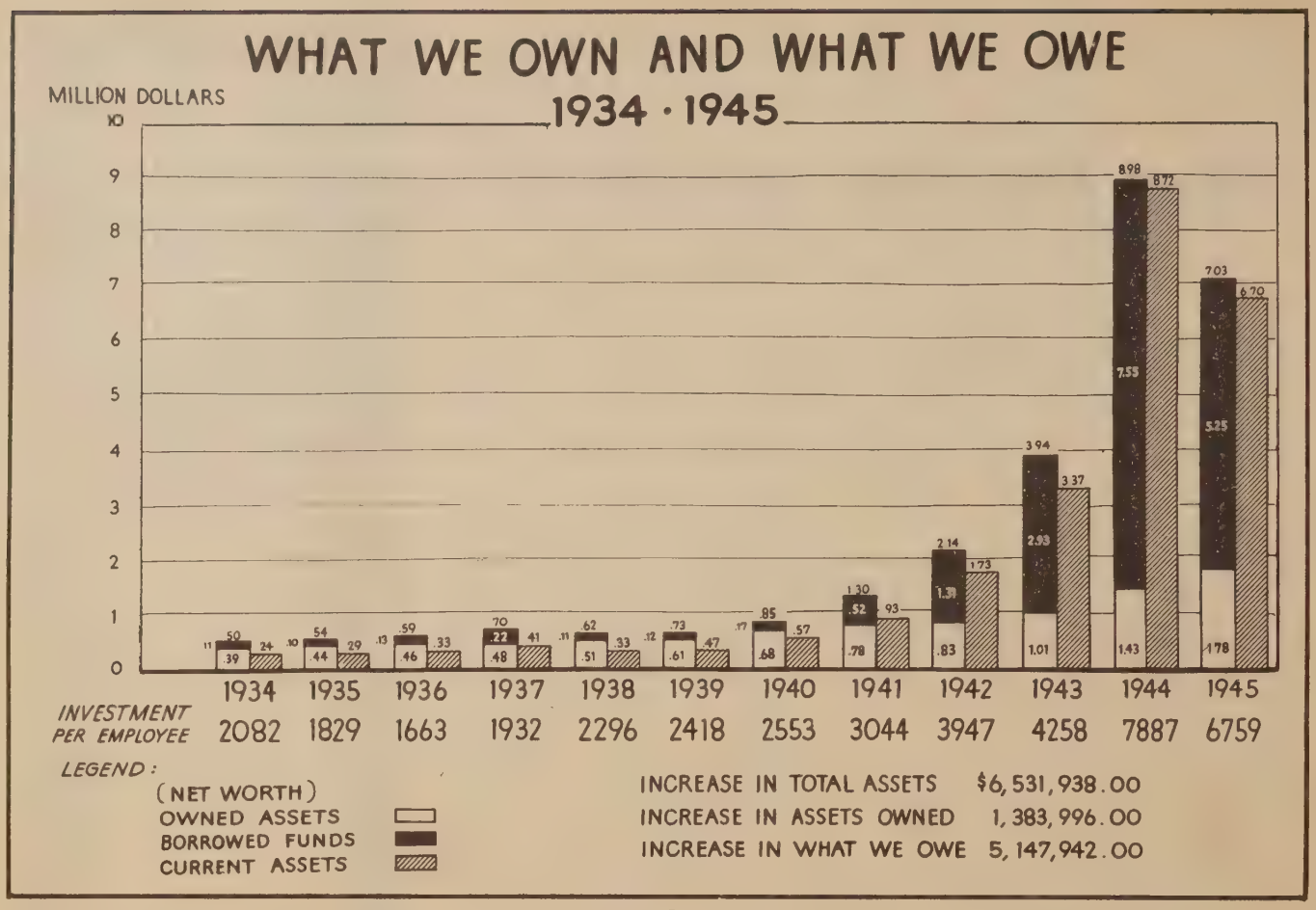
Rule No. 4. When dividing and the slide projects to the RIGHT, subtract the number of digits in the lower number from the number of digits in the upper number and ADD 1 for the RIGHT projection, to get the number of digits in the answer.

Example: $\frac{64}{4} = 16$. [2 digits — 1 digit + 1 right projection = 2 digits.]

Example: $\frac{64}{.04} = 1600$. [2 digits — (—1 digit) + 1 right projection = 4 digits. Note; (— —1 = +1).]

Example: $\frac{.064}{4} = .016$. [—1 digit — (+1 digit) + 1 right projection = —1 digit. Note: (— +1 = —1).]





Charts used in the course present concrete figures on the company's assets and distributions of funds. (See Figures 1, 2 and 3.)

Fig. 1

Basic Economic Facts

BRIEFED—How a Wisconsin company is endeavoring to educate its employes by teaching them the economics of free enterprise is related here. Key people, one out of every 14 employes, have been given a course built on facts and figures of the company's own operations. They now know the facts and can use them to puncture false rumors whenever they occur.

HOW can we hold on to the principles of free enterprise when many of the executives, supervisors, foremen, and key men of industry, and most of the workers in industry do not understand the simple economics of capitalism? How are we to meet the situation in which many of those who live by these economic facts lend eager ears to pretty promises and thrilling theories expounded by all types of false prophets who haven't a dollar's worth of production in their records? What can we do in industry to stem this avalanche of unsound ideas?

The "what" is easy. Educate our people in industry. Tell them facts. Teach them economics.

The "how" is not so easy. Education is one of the toughest industrial, as well as human, problems. No one learns without real effort on the part of the teacher. And who is going to be the teacher?

There is a lot we don't know at Webster Electric, but we think we've made a dent in the problem of teaching the economics of the American business system to our people. We think that what we have done works. We feel that we have made some definite progress.

First, we made certain that our supervisory staff and junior executives are managers in fact. We told them where we have been, where we are going, and what we are faced with in getting there. We ask them for help regularly, and we give them help in return, help in meeting the responsibilities they carry every day.

Second, we reconverted our house-organ into a tool of education and understanding. We dropped the gossip and the jokes, and we began to put into it management thinking on

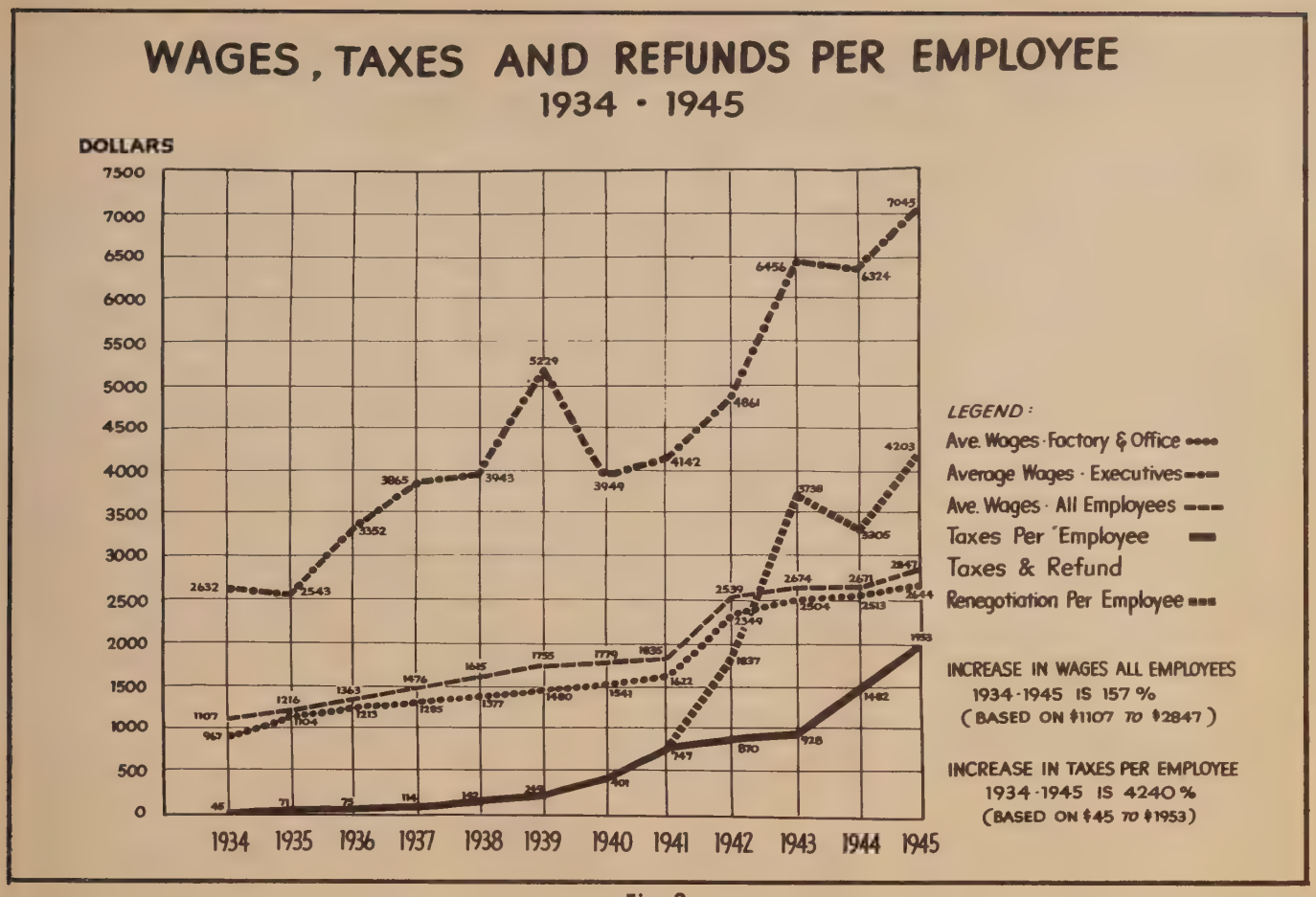


Fig. 2

for Supervisors

By B. E. Kline, Personnel Director, Webster Electric Co.

the real problems that we must solve together, the managers and the workers.

Even President Takes Course

Third, we put every key man in the company, one out of every 14 employes, from president down to sub-foreman, through the best course in the economics of free enterprise we could find, not just theory — a course built in terms of our own business, with facts and figures right out of our own operations.

We had wanted, for a long time, to teach our people economics, but we never felt we had the method until finally we found William H. Stevenson. Mr. Stevenson has spent his life in adult education and industrial relations. He got tired, a few years ago, of the way economics was being written about and took two years off to find out just what was wrong. He found that the stuff available left him out on too many limbs, so he set out to grow a tree he could climb without getting lost. We think he produced a real piece of lumber; and after 13 weeks of listening to his course, we're convinced that it is the best presentation of economics in America. It's sane and it's sound. It was presented in a manner that evoked immediate interest, and that interest was sustained to the end. There was no propaganda, no whitewashing; just simple facts, vividly explained, and illustrated by the facts of our own operations over the years—with the real figures.

The objectives were these:

1. To present the case of private enterprise honestly, clearly, definitely, and fully.
2. To reveal the real significance of profit to the economic progress of all the people.
3. To prove that capitalism is a system of forcing economic progress.
4. To show every man exactly what his company must do to be successful under the rigid requirements of capitalism.
5. To prove to all key men the absolute necessity for every company to cut costs, improve methods, and increase production per man-hour; these not merely to increase profits, but as necessities to make their own jobs secure, as well as the jobs of all their workers.
6. To correct a number of almost total misconceptions about special

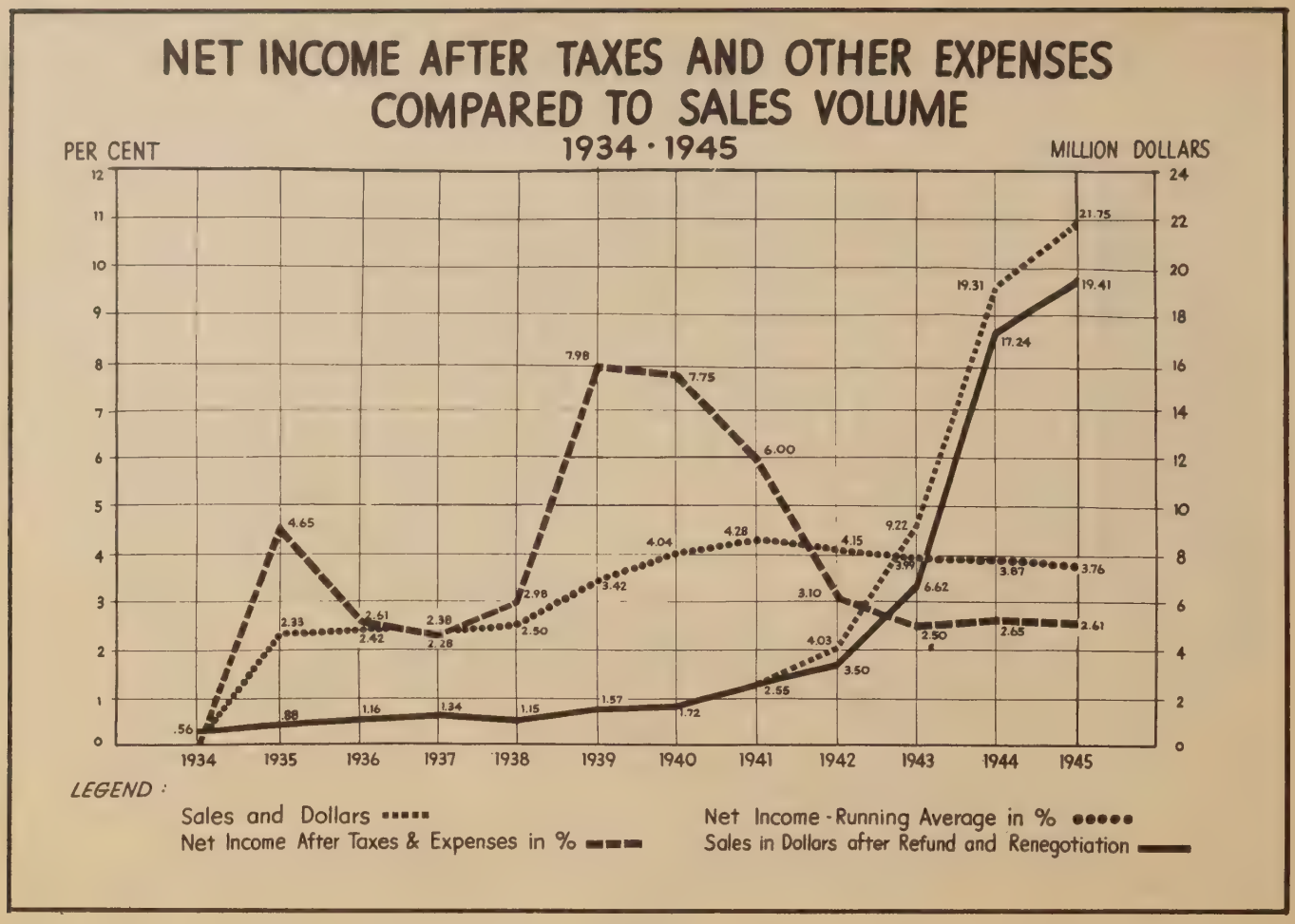

NET INCOME AFTER TAXES AND OTHER EXPENSES
COMPARED TO SALES VOLUME
1934 · 1945
PER CENT
MILLION DOLLARS
1934 1935 1936 1937 1938 1939 1940 1941 1942 1943 1944 1945
LEGEND :
Sales and Dollars
Net Income After Taxes & Expenses in %
Net Income - Running Average in %
Sales in Dollars after Refund and Renegotiation

Fig. 3

phases of our business system; about money, inflation, credit, prices, wages, distribution, and the government's relation to the economic activities of the people.

7. To examine the company's position and future in light of the many problems of the postwar period.
8. To examine the different types of proposals being made to solve the problems of the postwar period, and to evaluate these different proposals in light of facts brought out by the previous discussions.
9. To bring every key man closer to top management, to help each man feel his participation in management, and provide basic knowledge to help him in his job.

Mr. Stevenson led off with the profit angle. He touched production versus buying power. He talked about money, where it comes from, and what is behind it. He discussed credit. He took up the forces which control prices, and came to grips with that red hot potato, what is a fair wage. Complete charts showing where our company income goes and where it has gone over a period of years were presented. Company problems of the present and the future were discussed with complete frankness. The ever-present need to cut costs and improve methods in order to bring down prices and increase volume was brought out. Plans for solving our economic problems were considered, even the foolish ones. The series ended with a dynamic demonstration of the power of the private enterprise system to carry us to new heights of economic success if we follow the rules.

NEWS

How Are Jobs Created?

BITS ABOUT 'EM

Army Has Received 40 Webster Electric Hospital Systems

Sample page of employe magazine, presenting short article on economic facts.

Results of these discussions cannot yet be completely catalogued. But this we know: the 53 men who participated were genuinely enthusiastic about the course. No meetings in our whole experience have been so successful. Our key men have the story—the real story, and they're prepared to tell it wherever they go. The evidence is, they are telling it. They know the facts about our company, facts they can use to puncture rumor wherever they see its ugly head. They know how we must operate within the economic system, and they know that if we proceed intelligently, with our eyes open, and our ears at the proper angle, we'll be successful.

We've quit talking to ourselves, here at Webster Electric. We believe in our free system, and we're going to stand up and talk about it. We have 53 key men who can answer questions with facts. We have 700 employes who are going to get those facts every time an occasion presents itself.

Thawing Ice Out of Pipes

By R. F. Wyer
Electric Welding Division
General Electric Company

THE use of electric welding equipment to thaw frozen water pipes has been practiced successfully by a number of plant owners. Welding equipment offers advantages over other electrical means because it is self-regulating, can be accurately controlled, and is put to good use in a season when it might otherwise remain idle.

No special equipment is necessary other than reliable pipe clamps for making firm electrical connections. Strap-type clamps of copper, having ample section to carry several hundred amperes, are desirable. C-clamps to clamp cable terminals directly to the pipe where necessary, and a file, rasp, or abrasive cloth to remove zinc oxide, rust, paint, and grease to assure a good electrical contact may be used.

Cable should never be wrapped around the pipe as a connnection, since it may loosen and cause hazardous sparking. Ordinary pipe wrenches are required for disconnecting piping. A portable voltmeter is useful for checking voltage drops and determining continuity of circuits.

Connections to the welding generator are made in the ordinary way with the work lead and electrode lead both connnected to the pipe on opposite ends of the frozen section so that heat generated in the pipe wall by the passage of current will thaw the ice in the pipe. It is desirable to get as close to the frozen portion as is feasible without excessive digging in frozen ground. The machine should be set at the lowest current output adjustment at the beginning of a thawing interval in order to permit checking connections with the least likelihood of flashing.

While proper current for thawing pipes has been established as between 200 and 500 amps, the time needed to complete the job varies greatly according to the size, length, kind, and location of the pipe, condition of the surrounding soil, extent of the freeze, and temperature of the air. Tables I and II help determine the various factors involved.

While the resistances given are for direct current, the reactance is so small that it can ordinarily be neglected when cables are not coiled. There are so many other variables that the voltage necessary to produce the current will be, for all practical purposes, the same for both a-c and d-c. Table III shows maximum outputs obtained from the arc welding equipment normally used for pipe-thawing purposes.

Operation of Sets

Where welding sets are to be operated at less than 80% of their ampere rating, the operation can be continuous. The sets may be operated at their maximum output for intermittent periods up to 15 minutes if sufficient time is allowed for return to normal temperature.

There are certain precautions to observe. If a good, low-resistance joint is not obtained between the copper cable and water pipe, excessive heat will be generated at the connection. If the current is allowed to form an arc at this point, it may damage the pipe.

Care should be taken to select the correct amount of current where there is known to be lead in the service pipe, because lead pipes will stand less current than iron. Pipes should be disconnected from the building piping before the wiring so that the current has only one path in which to travel—through the section which is frozen. Otherwise, where other devices are grounded to the water pipes the ground wires may burn out and cause a fire, since the grounding connections will be raised above earth potential.

In using single-operator d-c sets, two points should be noted. The low load voltage may cause unusually heavy currents on the lower taps. Since these taps are designed to carry the low currents which will be drawn at normal operating voltages, the result may be to overheat portions of the series field. This is avoidable by setting the units on the highest tap and lowest open-circuit voltage which will give the desired current.

In addition, the low load voltage should be considered in estimating the current setting required. Since load voltages in the neighborhood of 5 or 6 volts will often be encountered, the output current on any setting will be as much as 1½ times the current drawn by a welding arc. With transformers, however, the current drawn by the load will be very nearly that indicated on the nameplate.

Resistance of the joints in the pipe also should be determined. If the joints are insulated by rust or pipe dope, a spark may start a fire.

TABLE I

Pipe Diameter in Inches	Recommended Amperes	Approx. Minutes to Thaw	Recommended Cable Size	Resistance per 100 ft. Cable
¼	75	15	No. 6	.0395
½	125	20	No. 2	.0156
¾	200	20	No. 0	.00984
1	250	30	No. 00	.00780
1½	300	30	No. 000	.00619
2	350	40	No. 0000	.00491
4	600	75	400,000 cm	.00270
6	800	120	600,000 cm	.00180

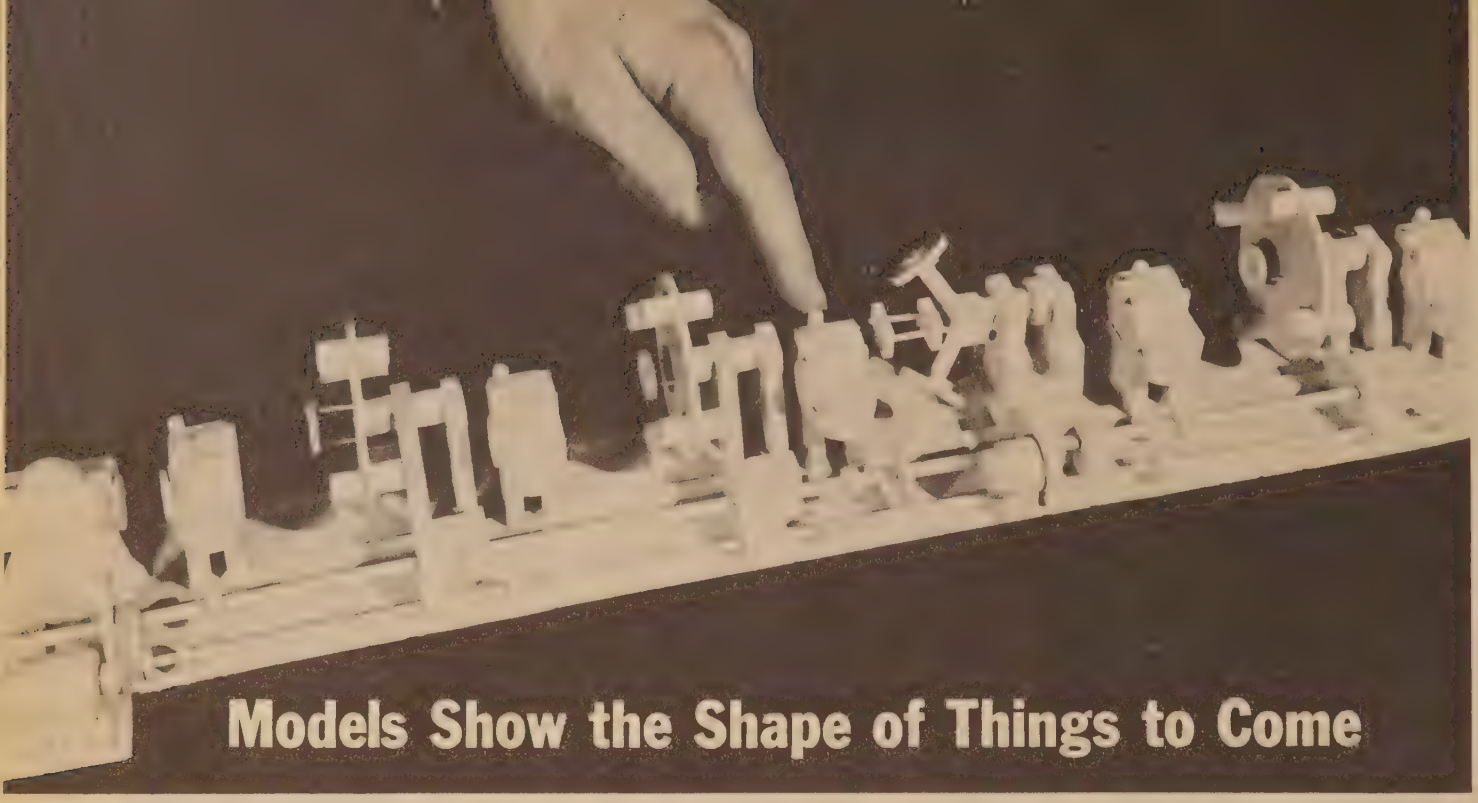
TABLE II

OHM RESISTANCE PER 100 FT. STANDARD PIPES

Pipe Diameter	Wrought Iron	Steel	Copper Tubing	Lead	Cast Iron Class A
½	.026	.0198	.00824	.0234	
¾	.0202	.01485	.00445	.01371	
1	.0138	.0100	.0034	.00984	
1½	.00842	.00618	.00208	.0064	
2	.00625	.0046	.00133	.0053	
4					.0092
6					.006

TABLE III

Equipment	10 Volts	20 Volts	30 Volts	40 Volts
300-amp a-c welders	500 amp	450 amp	400 amp	375 amp
500-amp a-c welders	800 amp	750 amp	700 amp	625 amp
300 amp d-c welders	650 amp	600 amp	500 amp	400 amp
400 amp d-c welders	800 amp	750 amp	700 amp	600 amp
600 amp d-c welders	1200 amp	1000 amp	900 amp	700 amp



Models Show the Shape of Things to Come

BRIEFED—Several thousand dollars were saved by this wire manufacturing company by the use of three-dimensional models in planning the layout of its new plant. The models include a variety of articles from tiny cable spools to giant bridge cranes.

By Hugh G. Jarman

WHEN Northern Electric planning engineers set about to do something, they are very thorough about it. A very good example of this thoroughness is shown when the board of directors decided to construct a new plant at Lachine, Quebec, near Montreal.

The new plant was to be an outstanding example of efficiency and modern construction—and it was to produce wire faster than it had ever been produced in Canada before.

A 90 acre tract was acquired. The floor space for the new plant was to cover over 50 acres of it, and the building was to be a one story type containing over 300,000 square feet of usable manufacturing floor space.

All machines are of the latest high-speed type, designed especially to facilitate the production of wire cable products. Each operation has been an important factor in the selection and arrangement of all machinery. These features are to be combined with the most modern mechanical handling equipment procurable for high-speed production methods.

With these instructions before them, the planning engineers could leave nothing to chance, while aiming at such high manufacturing speeds.

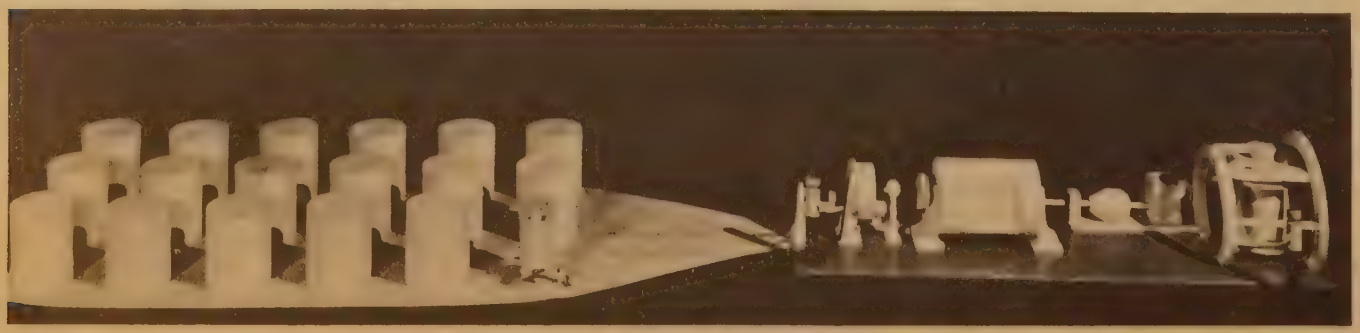
Three Dimensional Models

The planning engineers set to work making more than two thousand five hundred small scale models of every piece of machinery and equipment going into the new plant.

In a space set aside in the engineering department the entire 600 by 650 foot plant was laid out on the floor to a scale of two feet to the inch, and the entire plant constructed piece-by-piece, thus providing the engineers with a three dimensional plan which permits experimentation in arrangement and design without masses of preliminary drawings.

Among the great variety of articles involved in the scheme were tiny cable spools less than an inch in diameter up to the great roof sec-

Scale model of the cable-armoring machine.



tion model, which was constructed of plexiglass, and a scale model of the giant bridge crane which will operate in the new plant.

Constructed almost entirely of wood, the models are extremely realistic, and represent all of the machinery which will be installed in the plant.

Machine Operators Also Modeled

Small pegs or dolls were also constructed to scale, representing the actual position every employe will take when the plant is in full production. They were placed in the true positions of the machine operators. The engineers were able to arrange stock piles within easy reach of the operator and safety lanes, in which the mechanical handling equipment may travel, were also provided.

This method permits the planning engineers to consider the convenience of all workers. Tiny test chairs are placed in the testing section, and these remind the engineers that sufficient space must be allowed for "chairborne" people to maneuver.

The accurate models of motor-driven hoists and mechanical handling trucks would delight "Junior". But the planning engineers made certain that sufficient space has been left for the free operation of their "big brothers" which will actually be installed in the plant.

Photographs accompanying this article can only briefly indicate the great care and patience which has gone into the construction of these three-dimensional models.

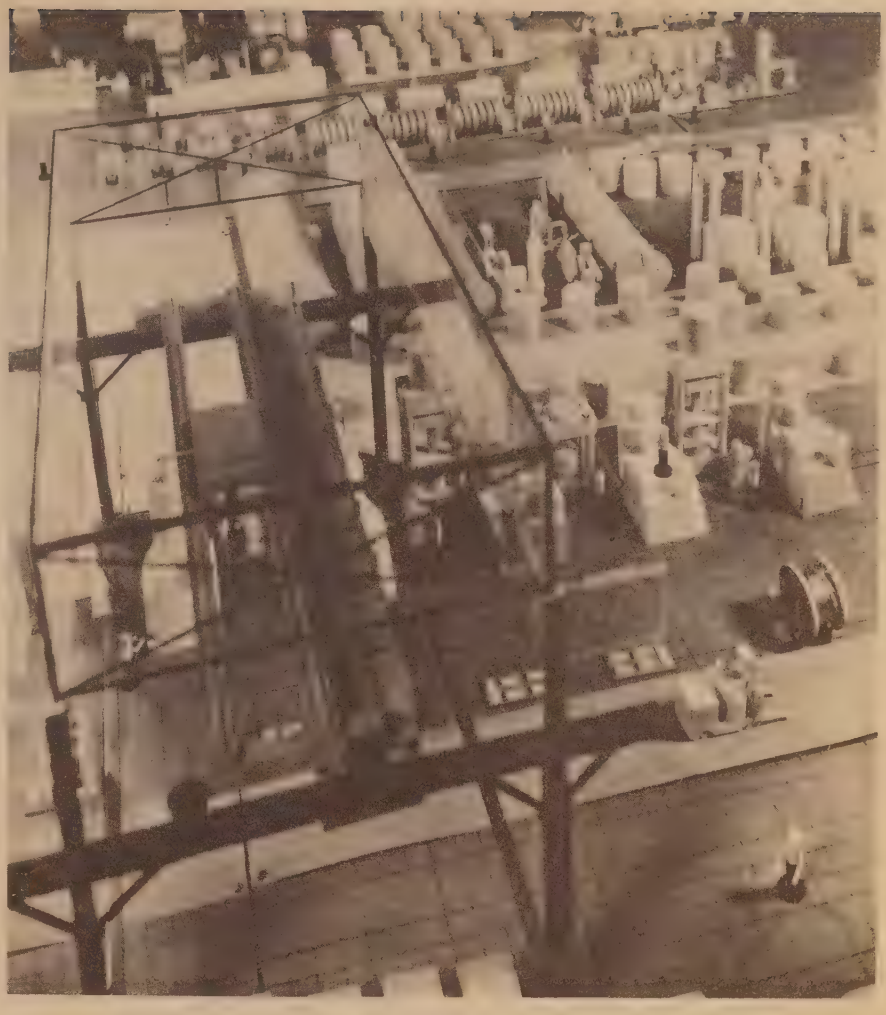
Thousands of Dollars Saved

When the final costs were gone into it was found that the use of the models had saved several thousands of dollars in the building design, and a good many headaches besides, which might have come up when the machinery was actually installed in the new plant.

Such a system of planning can only succeed where there is the utmost of cooperation between department heads and the planning engineering staff.

In this case each department was carefully laid out to the best ability of the planning engineer. Then the head of the department in question was called in and the layout fully explained to him. Any suggested changes were discussed pro and con between the two until both reached a final agreement at which time the final layout was then glued down to the floor plan.

This method of cooperation went on from one department to another throughout the entire plant.



A view of a part of the plant model.

The largest machine model in the layout was the wire cable armoring machine which measured 86 inches long and five inches high.

This same method can be employed with equal success in any mill or factory regardless of size, and will result in a material saving of time, money and worry.

A model section which includes the overhead crane.

Adequate Lighting Saves Stock Handling Time

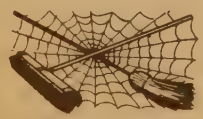
BRIEFED: The storeroom, because it is classed as a non-productive department, is often neglected, this writer points out. The importance of proper lighting in the storeroom is discussed, and factors to remember when installing a lighting system are outlined.

By Benjamin Melnitsky

Fig. 1.

POOR LIGHTING IS OFTEN THE CAUSE OF UNFAVORABLE STORES CONDITIONS

Correct lighting procedures are not cure-alls; however, many conditions can be improved by correct lighting.

Many errors in storeroom work. Wrong parts, sizes, weights, and materials delivered to shop. Paper work read incorrectly and posted in error.	Because of insufficient lighting, glaring lights, unshaded fixtures, etc., employes work in bad light and cannot read correctly requisitions and other paper work forms.
Poor output of work from stores. Orders are held up and jobs do not move fast enough into production.	Poor lighting causes men to waste time looking for parts. Delays are caused by misinterpretation of bin tags and paper work.
Floor space in the storeroom is poorly utilized. Some is entirely empty.	Dark areas, locations above the lights, and similar spots are not used because of lack of proper lighting.
Employes too old for regular jobs are placed in the storeroom, but do not perform satisfactorily in this department.	Output of older employes may be bad because they work in a poorly lighted environment, when they really require more light than younger people.
Stores employes complain of headaches, eye strain and excessive tiredness.	39% of all factory employes are visually handicapped. One plant cut its employe consumption of aspirins by 40% after installing a new lighting system.
Morale among stores workers is bad. Employes gripe, are absent frequently, come to work late, etc.	The psychological effect of being in a dim, gloomy atmosphere is bad. Morale is often lowered by minor irritations caused by poor lighting.
 Department is very untidy, dirty, and sloppy-looking, thus making working conditions more unbearable.	Dirt that can not be seen is rarely cleaned. Papers, dirt, cigarette butts, etc., on the floor, do not show up in a poorly lighted storeroom.
Accident rate is high in stores. Employes are continually hurting themselves and damaging parts.	Insufficient light, glare, light reflections, all cause after-images and bring about visual fatigue . . . all good bases for accident.

"*DURING the war accent was on industrial lighting, and, apparently, the stockrooms did not benefit particularly from this.*" This statement by an official of a large electrical manufacturing concern sums up concisely and accurately the present condition of storeroom lighting. Lighting in many storerooms is poor because almost all research and progress in industrial lighting has been restricted to other phases of plant operation.

This condition is true not only of lighting but of all other phases of industrial research . . . storerooms are the last to benefit from such research, the last to be improved. One of the basic reasons for this condition is found in factory nomenclature. The machine shop is a *productive* department, and the stores department is *non-productive* because it does not contribute directly to the fabrication, processing, or assembling of materials and parts. Non-productive implies unimportance and uselessness. It has a very unfavorable connotation. In too many plants this term has taken on the function of a derogatory, descriptive adjective. Thus, it is easy for plant management to disregard the stores department and concentrate on departments that are closer to the finished product.

Another reason for this condition is that inefficiency in the lathe department, assembly, the millers, etc., shows itself immediately on production schedules and other management records, whereas inefficiency in the storeroom is never an obvious condition. There are few paper-work means of ascertaining the relative degree of efficiency possessed by a non-productive department.

As a result of all this, the storeroom often lags behind other departments not only in physical improvements but, more important, in the quality and quantity of departmental work. One physical improvement that has a direct bearing on the nature of work done in stores is lighting Many of the shortcomings in storerooms can be traced often to poor lighting. This is indicated in Fig. 1. If, after an examination of Fig. 1, it is ascertained that lighting in the storeroom is poor, the obvious step is to change to good lighting.

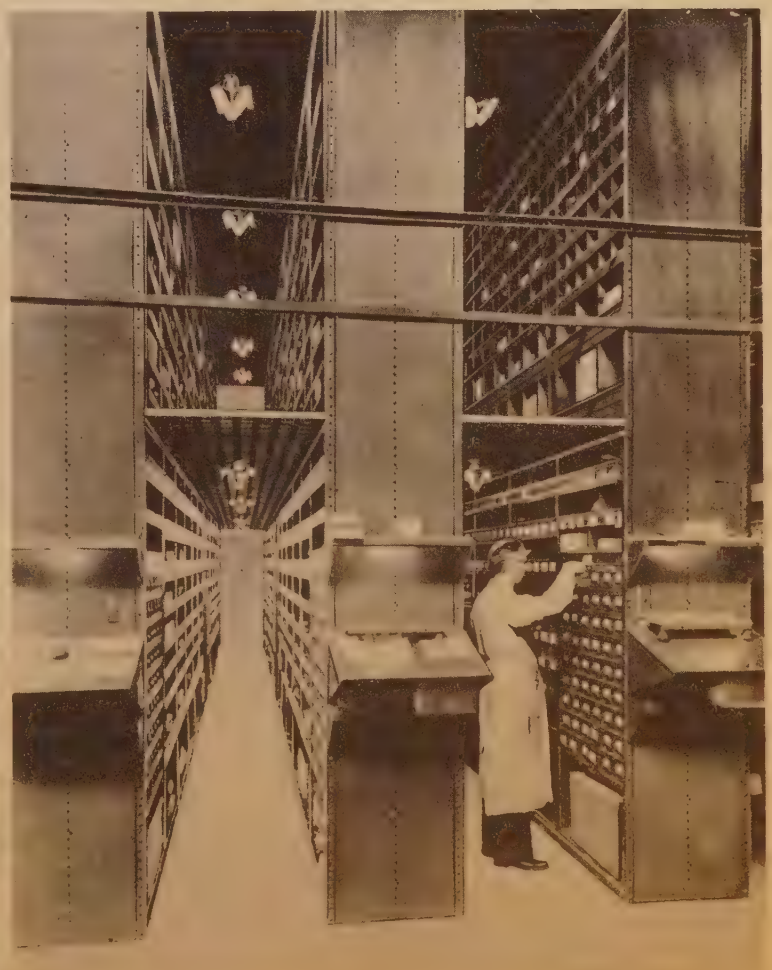
Good Lighting

Just what is good lighting? Good lighting may in some instances mean a dingy 20 watt bulb suspended from the ceiling by a cord, or it may mean a battery of fluorescent lights installed after a careful analysis of the storeroom by a qualified lighting engineer. Lighting that is good in a night club is not good in a hospital operating room. The same applies to storerooms. Lighting must be adapted to: (1) Nature of materials stored; (2) Location of storeroom; (3) Frequency with which storeroom is used; (4) When the storeroom is used. These factors should be considered always when good lighting is discussed.

If materials are stored in the yard and a 7 a.m. to 4 p.m. shift is employed, the lighting problem is solved by the most satisfactory lighting means — the sun. When materials in outside storage facilities must be handled at night, the problem can be solved by the use of a few flood lights and/or lights mounted on stands. Similarly, the sun is the solution when storerooms are located in buildings of saw-tooth construction or in buildings that have many sky-

Fig. 2. Natural light is utilized when storerooms are provided with skylights.

Fig. 3. Light must be concentrated in the narrow aisles, not up in the air.



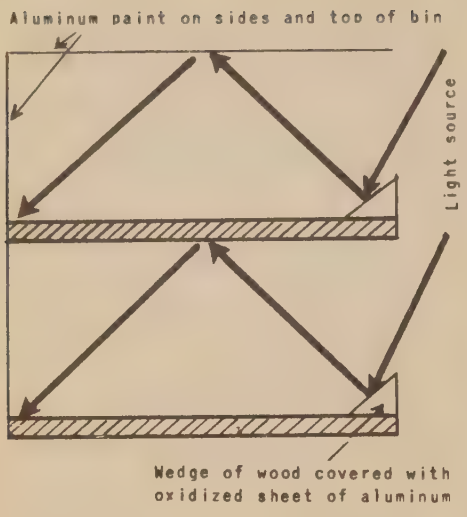


Fig. 4. Aluminum reflector deflects overlight light to brighten bin's interior.

Fig. 6. General lighting for entire area is required for open rack storage.

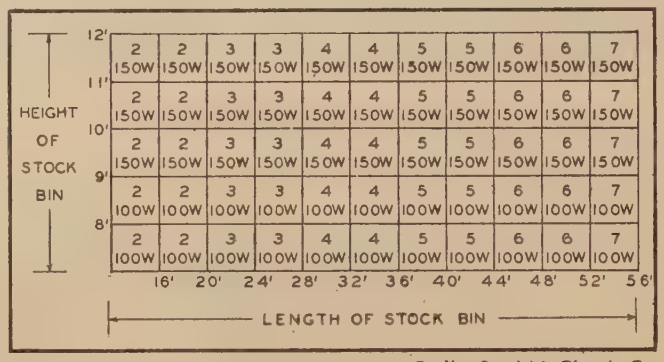


Fig. 5. Bin height and length affect number of lights and wattage required.

Credit: Goodrich Electric Co.

lights (see Fig. 2). The only problem in such types of storerooms is that of supplementary artificial lights to be used when there is not enough sunlight to provide proper amounts of illumination. If these buildings are used to store materials in bins or shelves, the problem would be an entirely different one because the problems of shadows and dark corners crop up and sunlight plus a few incidental lamps is insufficient.

Where materials are kept in dead storage, the amount of light need be no more than a few small bulbs at exits and entrances because the materials are not used frequently and men do not work in the rooms. If work has to be done in such a storeroom, temporary, stand-mounted lights can be used.

However, when the storeroom is a place where large crews of men are employed day and night, the problem of lighting becomes acute and highly important. There is a need for definite considerations as to types of lighting, quantity, and other precise facts of this nature. In analyzing lighting in storerooms there are two distinct stores catagories. The first is the storeroom where materials are stocked in closed shelves or bins. The second is the storeroom where materials are in open racks, on dunnage, or on the floor. The problems for these two types are distinctly different.

Materials Stored in Bins

When materials are stored in closed bins row upon row, the problem is one of illuminating not so much the material itself but the bin tag which indicates the contents of the shelf or bin. The light must be concentrated down into the narrow aisles and not up in the air. Consequently the fixtures used should be of the type that reflect all the light down. The fixture in Fig. 3 is parallel with the top of the bin and the light is directed down to the floor of the aisle and sidewards to the sides of the bins. The same effect can be obtained with the industrial type of fluorescent fixture sketched in Fig. 8. Where the interior of the bin must be lighted, an arrangement as shown in Fig. 4 can be used. There the overhead light is deflected into the bin by means of an aluminum reflector at the outside edge of the bin. The interior of the bin is painted with aluminum paint to reflect the light in all parts of the bin.

With the correct type of fixture, only half of the problem is solved. If the fixture is mounted too low, there will be a glare in the worker's eyes. Fixtures should always be mounted well above the normal line of vision. Another problem has to do with the reflected glare. If bins or other stores facilities are constructed from light-reflecting materials, they can be painted with some dull paint which will diffuse the light and eliminate glare.

Quantity of light is still another problem. If a 10 watt bulb is placed in the best fixture, little will be gained. The amount of light should be sufficiently great to permit employes to read even the finest print and to distinguish between the smallest identifying marks on pieces of material. A typical installation is shown on the chart in Fig. 5. It can be seen that the number of lights and the wattage of the lights depends on such variable factors as the height and length of the bins.

Supplementary lighting should be available. A good example of such lighting is shown in Fig. 3. At the end of each aisle is a small desk with a bright desk lamp on it. Any close work that requires more than the ordinary available light can be taken to the desk.

Materials in Open Racks

Where materials are stored in open racks or shelves, the problem is less of directing light into aisles and

Fig. 7. High open fixtures are needed when only artificial light is used.

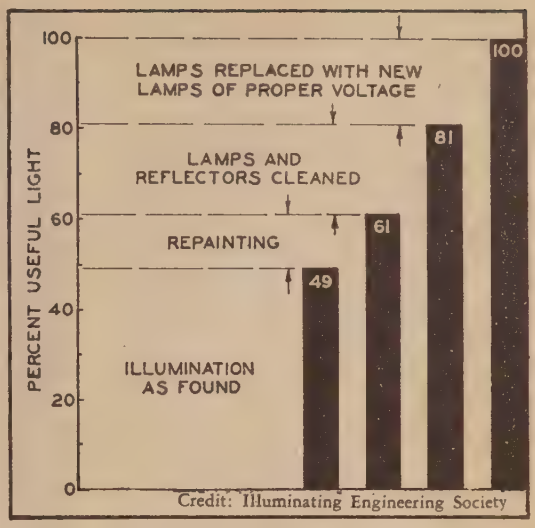


Fig. 9. The maintenance factor is important in getting proper illumination.

more of general lighting for the entire storage area. Where pipes and bars are stored on dunnage as shown in Fig. 6, full use can be made of natural light supplemented by artificial light. Where natural light is not available in sufficient quantities, full reliance will have to be placed on artificial light as shown in Fig. 7. Fixtures should be located high above the floor so that full illumination is given to the entire area. Open fixtures, either fluorescent or incandescent, should be used. The exact selection of lighting type depends on power costs, costs of installation, and other factors that vary with individual companies. The chart in Fig. 8 indicates power requirements for different types of fixtures and for different types of light.

Whenever natural light plus artificial light is used, a photoelectric control system can be used. The system functions in such a manner that when natural light falls beyond a predetermined value, artificial lights go on. When natural light increases, the mechanism turns off the artificial lights.

Maintenance

The final factor in any system of lighting is maintenance. Poorly maintained lights, dirty fixtures, badly painted walls and ceilings, and other factors affect the amount of light that is obtained from existing lighting means. This is shown graphically in Fig. 9. A regular maintenance schedule should be established and followed. Skylights should be washed; windows cleaned; lamps replaced, and all fixtures and lighting accessories checked periodically for operating efficiency and cleanliness.

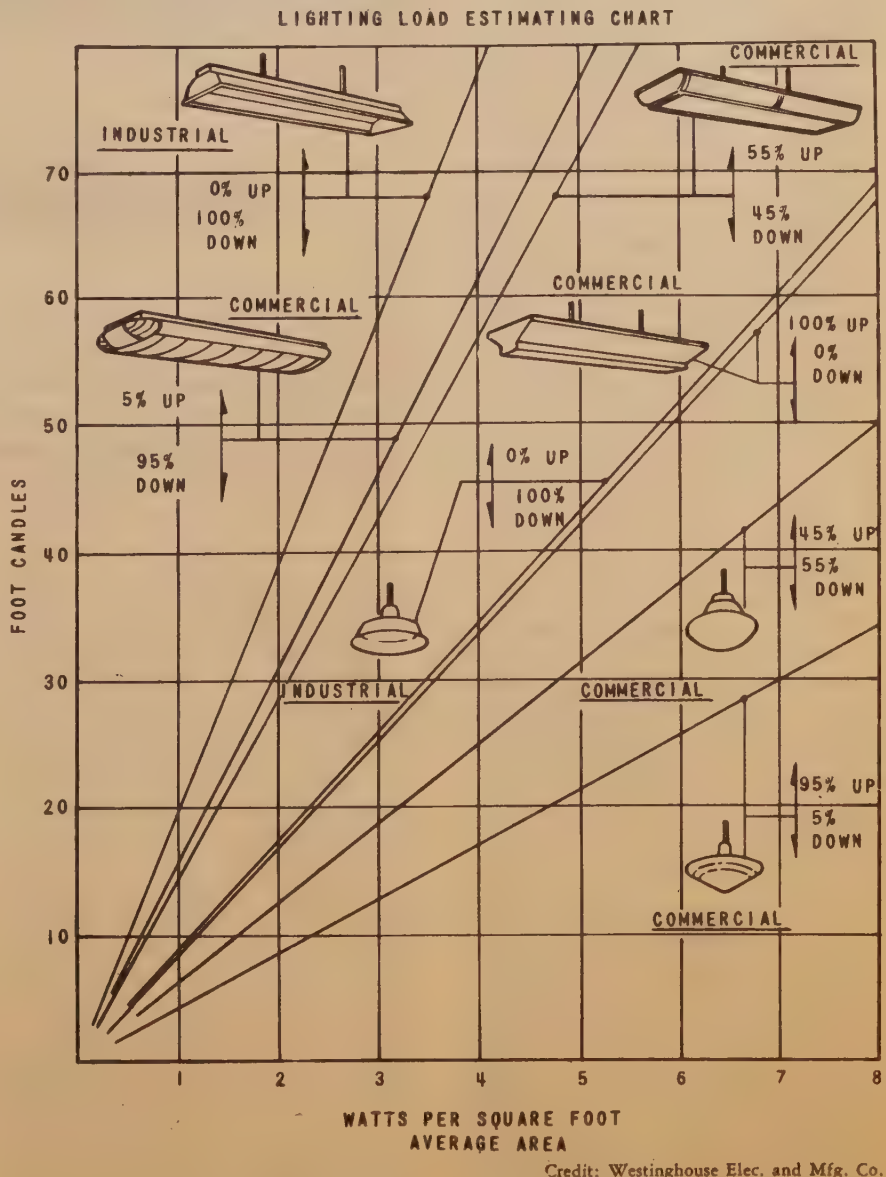
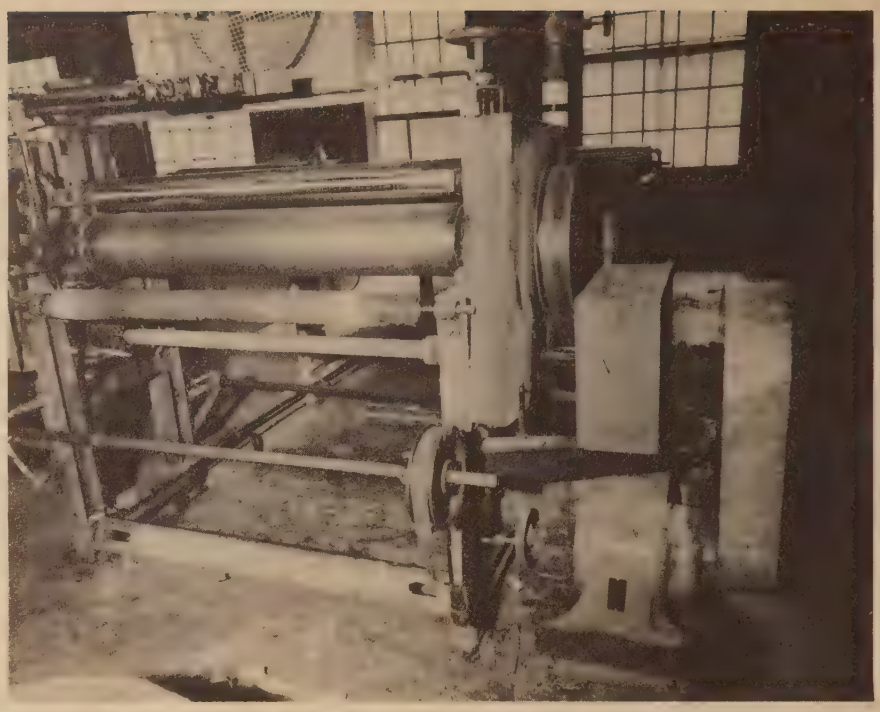


Fig. 8. Power requirements for different types of fixtures and types of light.



Rheostat controlled motor.

Finger-Tip Power and Steam

BRIEFED: A change in a company's products brought about a need for motors with highly sensitive speed control which could be instantly adjusted. Rheostat controlled direct current motors were installed, and an explanation of the change and system is given here.

RHEOSTAT controlled direct current motors have replaced group drives with three step cone pulleys on the spreader machines in the plant of the Hodgman Rubber Co. of Framingham, Mass., but the step cone pulleys have been kept in use on the motors and the machine spindles.

The reason for changing over to the direct current motors was to obtain finer gradients of speed control. This plant applies coatings of natural rubber compounds, synthetic rubbers, and plastics, to fabrics. The spreader machines receive batches of coatings materials and pass these materials beneath flat scraper knives which scrape them onto and into the fabric which passes continuously beneath the scrapers. The fabric then passes over steam coils which apply heat to evaporate solvents and to dry and set the materials to the points where the coated fabrics are ready for further process steps.

The amount of heat application needed for drying and setting the material varies with the kind of fabric, the ingredients of the coating material, the thickness of the coating, and the end properties desired in the finished items to be made of the coated fabric.

Such heat variation could be accomplished in two ways. One would be to vary the steam pressure within the coils or the number of coils in use and thus to control the output of BTU's from the coils to the fabric. The other is to control the speed with which the fabric passes over the heat source thus controlling the BTU input by controlling the time during which the fabric is exposed to the heat. Control of the heat source itself would be impeded by time lag; a reduction of the amount of steam would not cause the metal in the coils to cool instantly, and an increase would not cause the metal to heat up instantly. But with the rheostat controlled motors the control of the speed is highly sensitive and can be adjusted instantly for any desired heat input to the fabric.

Rheostat Range

The three step cone pulleys were retained and were applied to the motors and the machine drive spindles because they were conveniently on hand and because they extend the control ranges of the rheostats. The flat belt can be put on the smallest step on the drive pulley and on the corresponding largest step of the driven pulley and speed control adjustment made at any point within the range of the rheostat. If this range does not reach to a high enough speed, the belt can be transferred to the middle steps of the pulleys or to the high speed step on which the belt would be on the largest step of the drive pulley and the smallest step of the driven, and the rheostat again adjusted to any point within its range. The range of the rheostat is wide enough so that there is considerable overlap of speeds that may be obtained by changing the belt from one step to another and there is little need to make many such changes. Nevertheless, the complete range with three steps available on the flat belt pulleys is much greater than as if there were only one.

Varying the speed at which the fabric travels does not, of course, preclude varying the steam input and thereby the heat output at the steam coils. The speed variation is merely the more sensitive method, the easiest way to bring heat transfer into the desired balance.

Need for these sensitively controlled motors was brought about by changes in the company's products. In the old days, when nearly all coated fabrics were cotton ducks and all coatings were natural rubbers, the three speed step cone pulleys with group drives offered sufficient variations. But now the company coats rayons, Nylons, other synthetic fiber fabrics as well as wide varieties of the natural fiber ones, and makes its coating materials of plastics and synthetic rubbers as well as natural rubbers, each of which has problems requiring precise control of processes.

Rubber band unit group drive.

Control In A Process Plant

By Edwin Laird Cady

Over Motoring

At various steps in the production sequences the company uses rolling machines to break up raw materials, for mixing of ingredients, and to calendar the coatings onto some of the fabrics. These present a power problem in that their demand loads upon starting up are high and their running loads can fluctuate widely. In addition, each such machine must be equipped with an air brake capable of stopping it instantly if a man gets caught in it.

The power demands of such machines can be levelled off somewhat by running two or more from a single motor. With a little care in supervision the peak demands of two or more such machines on the same motor usually can be kept from synchronizing. But sometime the peaks do unexpectedly synchronize with the result that the motors cut out. This means readjusting of rollers and restarting of machines, a considerable waste of the time of valuable equipment.

A rule of thumb is that a mill needs one horse power for each inch of roller width. But when mills having a total of 180" of roller width were coupled to a 200 hp motor there were occasional cutouts due to over loading. Increasing the motor size to 250 hp eliminated the cutouts although with a probable sacrifice of efficiency since these heavier motors seldom are loaded to capacity.

Modern Group Drives

The Hodgman plant uses modern group drives wherever they will promote safety, reduce capital investment, keep the power demand bill in better balance with the operating load bill, or increase the flexibility of operations.

One such place is the churn room in which coating materials already prepared by other processes are mixed with solvents, plasticizers and coloring materials which had not been added at previous production steps. A churn, here, is a tank which contains power driven mixing equipment. There are several sizes of churns in this room, ranging from large ones for large batches to very small or "pony" sizes for mixing small special batches or for experimental or pilot batch use.

In addition to its mixing functions a churn also may act as a place of temporary storage for the mixed materials. No matter how the ingredients may be modified from batch to batch to be processed in the same churn, there rarely can be any change in the color to be mixed unless the churn is to be completely cleaned out before changing. The churns must be capable of retaining volatile solvents until those solvents are absorbed by the materials, consequently the cleaning out process can involve considerable hand labor for removing head bolts, lifting the head with a chain hoist, tilting the barrel for easy floor level access to its interior, and reassembling after cleaning.

All of this makes it economical to have more churns than are likely to be running at any one time. If the company were running only one coating material and had little need for stand-by churns, it could get along with one churn for every four which it now has.

Such conditions are ideal for group drive economies. The group drive motors and all their electrical equipment are located outside of the room and have gas tight packings where their shafts enter through the walls. This is to preclude any slightest chance of explosion of solvent vapors which might become mixed with the air in the room.

Efficient Loading

Each motor has assigned to it

Group motor for rolling mill.

such a group of churns as to give it highly efficient loading under ordinary operating conditions with plenty of capacity for occasional peak operating loads. The group drive shafts are parallel so that they can be belted across to each other in case of the outage or of the temporary too heavy loading of any motor.

The group drives also are high in safety when the churns must be taken down for cleaning. By merely removing a flat belt from its pulleys, all power connected equipment is out of the way of workmen, and there is no electrical equipment in position to be damaged while churn parts are being handled.

Group drives also are used to tie in the production sequences of the rubber band making machines.

The key factor here is laboratory control of individual batches. Equipment is set up in units so that the various sizes of rubber bands can readily be segregated by batches for close laboratory control of dimensions and of processes and qualities. This system turns out superior products but precludes having any one unit very large in capacity.

The raw material for rubber bands is extruded tubing. These tubes are fed to cutting machines which, because of the actions of their knives, are called "lawn mowers". A production unit consists of two cutting machines, one conveyor belt to receive their product, and one open ended revolving drum which receives the bands from the conveyor belt and keeps them in constant tumbling motion while a blast of heated air passes through them for a carefully governed time period.

Each such unit has its own motor from which power is transmitted by a group drive to its moving parts.

Light group drives also are used in the cloth inspecting and measuring setups. Here the convenience with which group drives can synchronize the motions of revolving parts which are somewhat widely spaced is valuable.

Thermal Balance

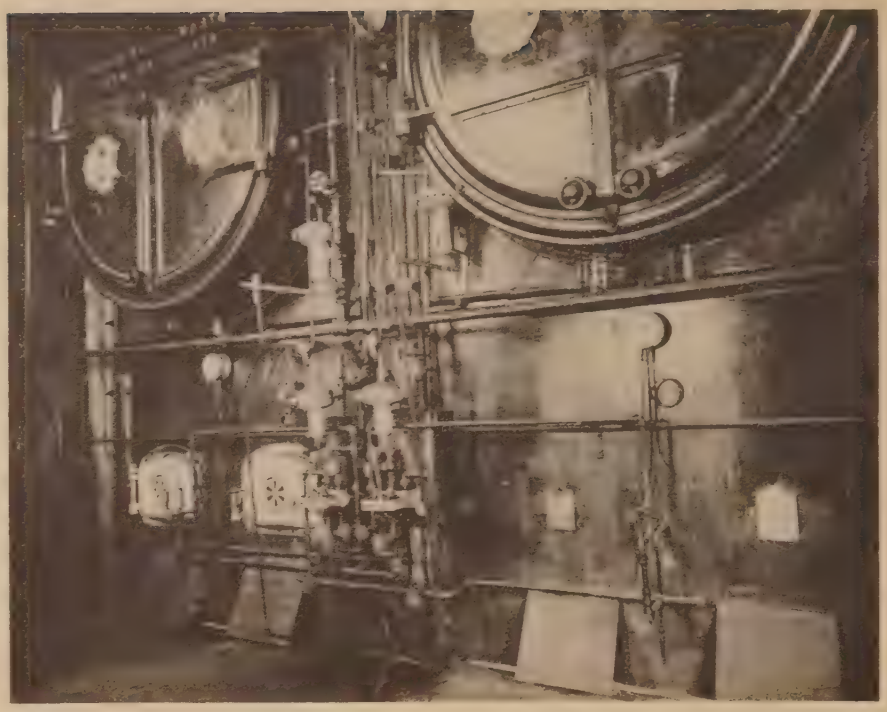
The relationship between between steam demand and power demand at a spreader machine is not constant but will change every time the speed of the motor is changed or other steps are taken to vary the heat input to the material in process. Furthermore, the number of such machines in operation at any one time can vary widely.

Some of the materials processed at the heavy rollers absorb heat and require that the rollers be steam heated; others give off so much heat that the rollers must be water cooled. Various of these machines may be changed over from one material to another in accordance with production demands. Consequently the process steam demand at these machines is changeable, far more variable than the power requirement.

Steam demand at the vulcanizers is more constant, but very little power is used here, and the number of vulcanizers in use at any one time can vary enough to impose a highly fluctuating steam demand load rather than create a state of balance within the thermal system.

These and other factors prevent the steam and power loads of the plant from having sufficient straight line relationships to each other so the company has thought it worthwhile to install its own power generating equipment and obtain process steam or hot water as a by-product. Power is bought but steam is produced in this plant.

The thermal system is, for the most part, a closed one. Steam is generated at 80 to 90 lbs. gage pressure and is used at full pressure at the vulcanizers. Pressure is stepped down to about 30 lbs. at the spreading machines and most other steam using equipment. Return water goes directly to a storage tank and is fed to the boilers by a steam pump driven injector.



An oil burner setup.

Oil Burners

Before the war oil burners were installed with automatic governors to make the heat input to the furnaces instantly responsive to the steam demand at the boilers. During the war the company, like so many others, was forced to reconvert to coal.

It was found that the boilers were so much less responsive to changed steam demands that if coal burning had been continued then under normal peacetime operating conditions, the capacities of the vulcanizers would have had to be doubled for the same amount of production. No attempt has been made to compare possibilities of pulverized coal or other highly responsive coal burning systems other than simple stokers against the results obtained by burning oil. But insofar as the direct experience of this plant goes, the cost of the extra vulcanizing equipment, exclusive of value of floor space and of installation costs, would have been slightly higher than the installed costs of the oil burners.

The oil burners, therefore, have paid for themselves by their elimination of the need for additional vulcanizing equipment alone. Items such as the spreading machines and some of the other equipments which operate much better with the highly sensitive steam responsiveness of the oil burners, are added profits.

Who Provides and Who Gets the Company Money?

A series of effective envelope inserts are used at Stewart-Warner Corporation to show employes the company side of their financial picture. These inserts are distributed with the payroll checks at two-week intervals, so that employes may take them home, read them and show them to the family. Each insert is done in two colors and tells its story in a few simple words.

HERE'S *"Your Share"*

.....AND A LITTLE MESSAGE ABOUT WHERE THE REST OF YOUR COMPANY'S INCOME GOES....

This check represents your share for one pay-period of the money received from purchasers of things made by the men and women of Stewart-Warner on the machines "owned" by the 17,227 stockholders whose pooled savings are invested in Company stock.

Out of every $100 the company received for merchandise sold in the first half of this year, checks to employees — JUST LIKE THIS CHECK OF YOURS — and money disbursed for benefits to employes required $46.95. Of the $53.05 left out of each $100 received, —

- $39.15 went for materials, supplies, services.
- $ 4.35 went for taxes.
- $ 7.81 went for depreciation and maintenance of tools, buildings, etc.
- $ .39 went into a fund for future use (to help keep jobs going, for instance, if something has to be bought to keep production rolling).
- $ 1.35 went to stockholders as earnings on their savings.

* The average dividend check to the 17,227 stockholders was $18.47. This represents TOTAL PAYMENT — not for one week or one pay-period, but for the entire six-months period.

The "LITTLE GUYS" WHO OWN "BIG BUSINESS"

Next time you hear an agitator scream that "the little guys ought to own big business," AGREE WITH HIM.

Tell him: "Wise-up, pal! THEY DO RIGHT NOW."

Ownership of your company, for instance, is in the hands of "little guys"* Several hundred of them,—both white-collar and factory workers — owning from a few shares to a couple hundred or more, punch the clock every work-day in this and other plants of the company. . . . Others, their savings invested in life insurance, investment trusts or in bonds, are likewise "owners" in that their savings have been re-invested for them in securities,— PUT TO WORK TO EARN INTEREST AND GROW.

Certainly "little guys" own big business: every wage earner with savings invested, —whether $100 or $1,000—is directly or indirectly co-owner of SOME business.

* 17,227 stockholders own an average of 73.89 shares apiece. At par value of $5 per share, the average holding is $369.45.

QUESTION: *What does it take to become a "capitalist"?*

ANSWER:

IF the owners of Stewart-Warner Corporation are capitalists, — and,

IF we are talking about the AVERAGE owner of Stewart-Warner stock —(see "Here's the Arithmetic" below) —who owns 73.89 shares, — and,

IF he bought his stock at par, which is $5 per share

IT TAKES **$369.45**

and **HERE'S THE ARITHMETIC**

17,227 persons own the 1,272,820 shares of Stewart Warner stock which are outstanding. As persons who have loaned their savings to others to provide the tools with which to operate a business - TO CREATE JOBS - they are "capitalists." They didn't all buy their shares at $5 a share; the price on the New York stock exchange in the past 15 years, has ranged from $1.87½ per share to $28.37½ per share. As of September 26, 1946, the price was $18.12½ per share. So the first 9 months of 1946, the average dividend - or earnings check received by these 17,227 "capitalists" who own Stewart-Warner was $18.47. At the September 26 price of the stock, that would have meant a return of $18.47 on an investment of $1191.46 for 6 months. On the basis of the 1946 high of $28.37½ per share it would have meant a return of $18.47 on an investment of $1548.85 for 6 months.

"I Like it this way"...

"I'm in business with some fellows.*

"They got together and pooled their savings . . . bought some buildings and machinery . . . and we make things and sell them. . . . 'Free enterprise system,' it's called.

"I like it this way. . . . I wouldn't change it for the world. . . . Every week I get my portion of what we take in . . . and, the better the stuff we turn out and the more efficiently we use the machinery, the more we'll *collect* to divide up. . . . *That's* the only kind of '*collectivism*' that I'm interested in!"

* There are over 17,000 persons who "put up the money" to create jobs at Stewart-Warner. They—the stockholders—received an average of $18.47 as *their portion* of "what we took in" in the first half of 1946. (That $18.47 is for the ENTIRE six months—not per week or per month).

Joint Union-Company Apprenticeship Plan

BRIEFED: The apprentice-training plan at Higgins, Inc., was set up by union and management and is administered by an apprenticeship committee comprised of representatives of both groups. A complete description of the plan is presented here.

By David Markstein

AN apprentice training plan, which both the U. S. Department of Labor and the Louisiana Apprenticeship Council describe as one of the most complete and thorough-going in the nation, has been set up at the three plants of Higgins, Inc., New Orleans builder of boats, small ships, auto trailers and, soon, prefabricated home material.

The plan is unique in that it was blueprinted jointly by company officials, including president Andrew J. Higgins, and Local 73 of the CIO Industrial Union of Marine and Shipbuilding Workers of America. These two—the company and the union — administer the apprentice training plan in cooperation through a joint apprenticeship committee. Two of the four members of this committee represent the company, two the CIO union.

A complete, written blueprint for apprentice training in every classification has been formulated by this committee. Each apprentice is furnished a copy of the entire training plan.

The kind of production-wise thinking which went into formulation of the plan may be judged from its foreword: "In view of the na-

The apprentice learns how to fasten cable clips on wire rope.

ture of the business of the Corporation and of the inherent responsibility of both the corporation and the members of the union to provide the maximum in highly skilled service, it is essential that apprentices be broadly trained in all of the mechanical aspects of their work. This end is to be obtained through providing each apprentice with systematic work experience in all of the divisions of the trade under the direction of expert mechanics. In addition, highly skilled craftsmen must be capable of exercising independent judgment, understand the theory underlying the work they are called upon to do and the properties of the materials used, know the laws and regulations applicable to their work, and be capable of advancing, in time, to positions requiring leadership and responsibility."

Serve One Year

Members of the joint committee each serve for one year, then are replaced by appointment from the company and union. The committee has jurisdiction over every phase of the apprenticeship program—agreements, shop training procedures, wages, working conditions, classroom instruction, settlement of grievances and complaints, and certification of completion to the state Department of Labor. It is the final authority and arbitor of all training matters.

Applicants for training under this program must be 18 years or older. High school educations are not mandatory, but the committee gives preference to those who do hold diplomas.

The apprenticeship period covers four years, with a gradually increasing wage scale setup. Altogether, 8000 hours of training on the job are given, supplemented with classroom work which the New Orleans public school system has agreed to handle by arrangement with the joint committee. The "related instruction" includes 144 classroom-hours during each training year.

During his first three months, the fledgling apprentice is considered on probation; either he or the company may cancel the apprenticeship agreement during this time with no hard feelings. But after the expiration of three months, a proposed cancellation must be passed upon by the committee.

Each department in which apprentices are trained has a special shop supervisor of apprentices appointed by the department head and approved by the joint committee. It is this official's responsibility to see that apprentice training proceeds smoothly in his bailiwick, and that apprentices are moved from job to job in accordance with the committee's training blueprint.

Welder gives trainee instructions as part of the shop training.

Check On Progress

Because apprentices' wages are upped automatically every three months, it is necessary that the joint committee keep complete tabs on each trainee's progress. The shop supervisor of apprentices submits a progress report for each of his charges every quarter. Sometimes the supervisor finds that a trainee in his shop is not suited to the work he is doing, or just doesn't care. This opinion likewise goes into the report and, only after the committee has made a decision, may the apprentice be dropped from training. (Notice of a training-termination must then be given to the Louisiana Apprenticeship Council, arbitor of all on-the-job training in the state.)

Some 185 trainees are presently working toward job-certification. As soon as this number reaches the maximum which the program is expected to attract — 500 — the company-union blueprint calls for appointment of a general supervisor of apprentices to coordinate and direct the work of the shop superintendents.

Apprentices work the same weekly hours as skilled workers—40—and are given the same overtime pay. Time and a half and double time provisions apply only to wages, however. Overtime work is credited toward completion of training only at a straight time rate.

In accordance with the automatic wage increase provision of the plan, the schedule below, based upon a 40-hour week, governs apprentice pay:

1st 500 hours	(13 weeks)	$ .93 per hr.
2nd 500 hours	(25 weeks)	.96 per hr.
3rd 500 hours	(38 weeks)	.99 per hr.
4th 500 hours	(50 weeks)	1.02 per hr.
5th 500 hours	(63 weeks)	1.05 per hr.
6th 500 hours	(75 weeks)	1.08 per hr.
7th 500 hours	(88 weeks)	1.11 per hr.
8th 500 hours	(100 weeks)	1.14 per hr.
9th 500 hours	(113 weeks)	1.17 per hr.
10th 500 hours	(125 weeks)	1.20 per hr.
11th 500 hours	(138 weeks)	1.23 per hr.
12th 500 hours	(150 weeks)	1.26 per hr.
13th 500 hours	(163 weeks)	1.29 per hr.
14th 500 hours	(175 weeks)	1.32 per hr.
15th 500 hours	(187 weeks)	1.35 per hr.
16th 500 hours	(200 weeks)	1.38 per hr.

A set procedure for handling apprentice grievances has been instituted. It provides that:

"(a) If an adjustment satisfactory to the apprentice involved cannot be made between the shop steward and the foreman within 36 clock hours after being presented to the

foreman or head of the department, it shall be taken up within three days by the chief shop steward with the general supervisor of apprentices;

"(b) If an adjustment satisfactory to the apprentice involved cannot be made with the general supervisor of apprentices, it may then be referred in writing to the full apprenticeship committee within three days;

"(c) If the apprenticeship committee cannot agree in the settlement of the grievance or difference, it shall be taken up between the union grievance committee and the director of industrial relations at the next weekly grievance conference."

12 Classifications

A complete training plan covering the full four-year period has been worked out for each of 12 job classifications. These are: blacksmith's apprentice, boiler shop layout apprentices, automotive apprentices, loftsman's apprentice, ship carpenter's apprentice, machinist's apprentice, pipe shop apprentice, sheet metal apprentice, shipfitter's apprentice, electrical apprentice, patternmaker's apprentice, and coppersmith's apprentice. Tools required (Government-furnished) are listed where necessary and, in some cases, the training blueprint even details the duties of the job in question. The number of working hours to be spent in each kind of training are indicated.

A typical training plan—for machinist's apprentice — provides for everything in detail:

"1st Period: 160 hours tool crib; 160 hours office; 320 hours helping on big machines; 160 hours drill press; 200 hours main lay-out table.

2nd Period: 200 hours main lay-out table; 320 hours milling machine (blades); 400 hours lathe (small); 80 hours maintenance.

3rd Period: 320 hours maintenance; 400 hours layout (small table); 200 hours assembly (auxiliaries).

4th Period: 120 hours assembly (auxiliary); 400 hours lathe (advanced work); 400 hours shaper; 80 hours turret lathe.

5th Period: 240 hours turret lathe; 400 hours layout and small assembly work; 360 hours turbine assembly.

6th Period: 40 hours turbine assembly; 400 hours Bullard; 400 hours lathe (large); 160 hours Landis.

7th Period: 320 hours Landis; 400 hours tool room; 280 hours planer.

8th Period: 200 hours planer; 480 hours milling machine or punch and die; 320 hours elective.

"Apprentices who start their apprenticeship in the engine installation department will serve their first 3000 hours, or any portion thereof, as follows:

Hours	*Type of Work*
120	Tool crib attendance
260	Engine & pump installation
360	Sea chests (layout & fitting)
360	Running line shafts
360	Ammunition hoists, turrets, etc.
360	Engine and gear alignment
360	Fireroom piping, evaporators, distillers, etc.
360	Installation of generators & pumps
360	Steering gear, boat cranes & anchor machinery
260	Refrigeration & ventilation.

"Balance of the time to make up the 8000 hours will be spent in the machine shop."

For loftsman's apprentice, the training schedule provides:

160 hours—In the Molf loft office or general shop work to get acquainted with different drawing charges applied to various structures of the ship. To learn how to apply bills-of-material, requisitions and revision sheets.

840 hours—Instruction under supervision in general practice of marking templets for various structures of the ship's hull, use of tools and shop machines, how templets are marked and applied to iron. Neatness and accuracy of measurements stressed. Reading of blueprints, and doing rough work.

This test period will determine applicant's mechanical ability and general fitness for the trade.

500 hours—Under supervision doing rough work such as furnace plates, rough frames, beams and wood templets for standard work.

500 hours—General templet making (under supervision).

160 hours—Laying out templets in Plate and Angle Shop.

130 hours—Assembling in Plate and Angle Shop.

680 hours—General templet making (under supervision).

2000 hours—General templet making (under supervision.)

500 hours—Shipfitting—hull department.

500 hours—General templet making.

1000 hours—General templet making part of which to be individual work.

1000 hours—General templet making part of which to be individual work.

Between third and eighth period apprentices will get 500 hours on scrieve board.

TOOLS REQUIRED

1 Block plane
1 Claw hammer
1 pair 12 in. dividers
1 Bit brace
1 small spoke shave
1 CC-12 pt. Hand saw
1 Three-foot rule
1 Curps bevel
1 marking gauge
1 Try square
1 Scriber
1 Three-foot (1/16 in.) Steel rule

Automotive apprentices get 1040 black hours; 693 on carburetors 693 on ignition systems; 520 working on bearings; 1040 on timing; 520 on transmission work; 1040 on differential; 520 on front end work; 520 on wheels; 520 each on hydraulic and mechanical brakes, and 520 on vacuum brakes.

The curriculum for patternmaker's apprentices provides that for "the first six months the apprentice will be assigned to such simple tasks of a pattern shop as he can perform, and during that period he will be expected to familiarize himself with most of the department and yard procedures. During this same period he will have the opportunity to watch mechanics at work and where possible be given the chance to act as a helper.

"Beginning with the second six months he will be assigned to small jobs under the supervision of a leader, and as he progresses he will be given more difficult jobs requiring greater skill and adaptability.

"At the beginning of the second year, to the end of his apprenticeship, he will have the opportunity to work on every type of work that goes through the department, and his progress to more difficult work will depend entirely upon his ability to qualify.

"During his four years of apprenticeship he will receive training in every phase of pattern work of a modern pattern shop."

On the touchy question of union membership, the joint committee has hit a compromise based upon the company-CIO contract which provides for maintenance of membership but not for the closed shop. Under the committee plan, no pressure may be put upon trainees either way — by the company or by the union. The apprentice is thus free to join or to stay out of the union. But if he does decide to join, he is in the union for good.

Maintenance by Departmental Crews

By Fred M. Burt

BRIEFED — The greater portion of equipment maintenance in this plant is handled by individual maintenance crews, each assigned to one production department. These crews are in turn backed by fully manned machine, carpenter and electrical shops, the personnel of which can handle the larger repair and installation jobs. All paper work for maintenance jobs is kept at a minimum.

IN the largest ceramic plant on the west coast, the main plant of Gladding, McBean & Co., in Los Angeles, plant engineering and maintenance is compactly organized to function under the supervision of Industrial Engineer T. E. Carothers, his assistants and foremen. (See Organization Chart).

Besides handling these responsibilities in this extensive plant, where pottery, china, wall tile and sewer pipe are manufactured in large quantities, this organization does required work for other Gladding, McBean plants in the Los Angeles area. Two of these are refractories plants and the third one in Santa Monica produces roof tile and sewer pipe. Each of these has its own maintenance crews to handle all work that does

Section of the maintenance carpenter shop.

not justify calling on the main engineering and maintenance facilities.

Besides plants in the Northern Division in Seattle and Spokane, the company has a terra cotta, sewer pipe and roofing tile plant at Lincoln, California, a fire brick plant at Livermore, and refractories plants at Pittsburg, California and at Lehi, Utah. A close cooperation is maintained between all of these factories so that any improvements in efficiencies realized from new methods or equipment at any location, is made available for use at any other plant where the application might be advisable.

A recent reorganization of the maintenance personnel was made, so that now three former maintenance foremen, each with a crew of six men, are assigned to one individual production department—sewer pipe, tile and pottery-china. These departmental maintenance groups each handles all repairs and servicing jobs in the individual department to which they are assigned.

Requirements in any department that involve changes in plant layout, changes in equipment design, alterations to machinery, alterations to buildings, or additional hook-ups with existing plant facilities such as air, steam, dust collecting etc. are taken up with Plant Engineering before proceeding. Any new equipment installations or changes required by the improvement program, or required by the department superintendent, are handled as far as possible, by the men within that department but under the general direction of the Plant Engineering Department.

A tunnel kiln for sewer pipe being constructed by the bricklayer section of the maintenance department.

Various Shops

The machine shop, carpenter shop, electrical shop and bricklayers operate under direct Engineering Department supervision, as service and construction departments for all of the production departments and their maintenance sections.

In the large and completely equipped machine shop there are 6 tool and die makers, 8 journeyman machinists and machinists helpers, a welder and two garage mechanics, who constitute the major personnel in addition to the foreman and his assistant. The facilities of the machine shop are devoted to varieties of overhaul work, making of new parts, new jigs and fixtures, new machines and all of the other jobs best done by the equipment and skills contained therein. This work is done not only for the main plant, but for other plants in this area, with some special jobs for the more distant Gladding, McBean factories. Main-

tenance and repair work is also done on all automotive equipment — 24 passenger cars, station wagons, pick-up and larger trucks up to 9-ton capacity, yard equipment used in moving clay and clay products—all of the powered equipment in the Southern Division.

One of the typical jobs handled through the machine shop is the chrome-plating of dies subjected to the wearing action of such operations as forming roof tile, bricks, or extruding sewer pipe. This hard surfacing of such dies has extended their service lives as much as tenfold as compared with unplated units.

The carpenter shop is not only a busy spot for the production of all manner of wooden products needed throughout the plant, with some 20 carpenters and helpers to include pattern and mold makers, cement finishers, and painters; but is also the headquarters for the labor pool of about 10 utility men to supply needs for extra laborers and other help throughout the plant in other than production work. So it is more than a carpentering section. As is the case with the other sections of this Engineering-Maintenance department, the carpenter shop will soon be moved to new and better quarters as a part of a comprehensive plan of improved plant layout. This is consolidating and re-locating some of the production units for greater manufacturing efficiencies; also providing many new units of diversified types of equipment. This is all adding up to much extra work for the Maintenance and Repair section, with assistance from all of the others.

There are from 8 to 10 electricians and helpers in that section, to service all of the many types of electrical equipment, switchboards, controls, wiring lights, etc. Sufficient personnel is maintained, along with ample supplies and working equipment, to keep ahead of requirements and keep all electrical equipment in prime operating condition.

The seventh and last of these divisions of the Engineering Department takes care of bricklaying and allied work, using four bricklayers and six helpers, in addition to a foreman. With 24 tunnel kilns and more than 30 beehive and other kilns to keep in shape, and with an occasional new kiln to build, bricklaying is a major job in this plant.

In spite of the great varieties and hundreds of units of equipment, designed, constructed, installed, serviced and repaired — ball mills, kilns, presses, clay-working equipment, conveyor lines, trucks, racks, dry-

A view of the maintenance department machine shop.

ers, special ceramic devices, controls, burners, sprayers, etc. — much of it subjected to severe operating conditions — very little paper work, and no complicated procedures, are employed to get all of this work done promptly and efficiently.

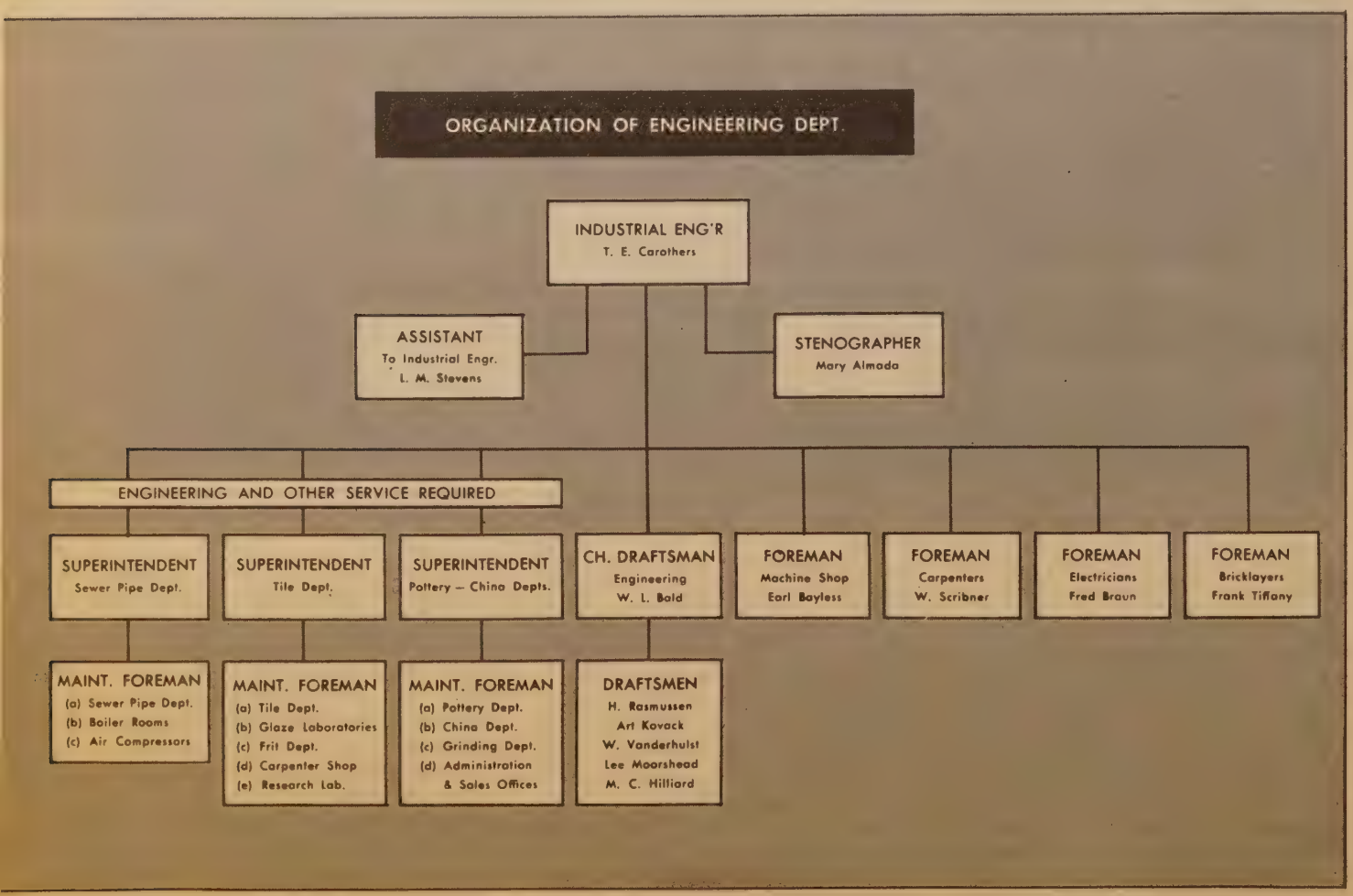
Minimum Paper Work

There are few rigid rules of procedure. Small requirements from any department are often met by simply calling the foreman who can supply the man to meet the need. Or a call to the department office will cause the issuance of an order to "Please Perform The Following Work" which is forwarded to the foreman concerned.

When some department head, foreman or individual in the department has a good idea requiring some work to be done, a construction to be made, or a purchase, any of them entailing an expenditure of some consequence, this idea with proper explanatory detail is transmitted as indicated, to the Engineering Department. If it is there considered worthy of further action, an "Authorization For Expenditure" form is filled out in quadruplicate. Copy four is kept in the Engineering Department and the other three copies go to the Authorization Committee for probable approval as few that are not fully justifiable ever get past Engineering. Copy two, approved, goes to Accounting as their authorization to issue a Work Order and this goes with copy No. 3 back to Engineering — this copy No. 3 being the Working and Authorization copy. Proper drawings (if any) and other directives required, are made up in the Engineering Department and transmitted to the men concerned. If any purchases are required, Engineering makes out a Requisition on Purchasing, in triplicate.

After the vendor's name has been entered on the Requisition copies in the Purchasing Department, along with prices and other necessary information, the yellow (first) copy is stamped with the notation: "Above has been ordered. When material is received, please sign and return this copy to Purchasing Department attached to Delivery Slip". This copy is then returned to Engineering to be held until the goods are delivered. This Purchasing Department is another one in the company that has eliminated anything that is even remotely non-essential, with a small personnel under Purchasing Agent John J. McGinnis, that handles a far greater volume of business than might be expected.

Work Orders for each job are placed in manila envelope "Job Pockets", in Engineering, to be subsequently accompanied by all other data on the job that might be accumulated. Other copies of the Work Order are sent to all of the sections of the Engineering Department whether they are directly concerned or not. By doing this each foreman is acquainted with all of such jobs that are authorized, and even if a foreman has no part in a specific job, often further developments do concern him, or he may have some knowledge or ideas of value which he is thus solicited to offer.



Ventilating and lighting this windowless U.S. Army ordnance plant, presented somewhat similar problems. The ventilating problem was solved by distributing conditioned air in a draftless pattern through Anemostat air-diffusers; the lighting problem by installing six miles of fluorescent tubes.

Air – Like Light – Must Be Diffused For Higher Efficiency In Plants

BRIEFED: Proper air diffusion is essential to efficient ventilation, the problems of which are in many respects similar to those of effective lighting. Improved ventilation will pay for itself through higher efficiency of workmen, improved quality of product, and a reduction in rejects.

By George R. Wallen Assistant to the Chief Engineer, Anemostat Corporation of America

INDUSTRY now benefits from knowledge gleaned about air-conditioning in war-plant installations. And, in some respects, this knowledge closely parallels the information gained about lighting in the same plants.

For example, when engineers and architects were planning the huge machine shop for a U. S. Army ordnance plant at Gadsden, Alabama, the ventilating and lighting problems had certain similarities.

Because of blackouts and a 24-hour work-day, the 300- by 500-foot building was to contain no windows and the usual saw-tooth or monitor type roof was impractical.

Prior to the war, concentrations of high candle-power lights and rapid air changes, in themselves,

This shipping room of a Dairy Plant was originally equipped with two ceiling-type unit coolers discharging air through conventional grilles. When the grilles were replaced by air-diffusers, working conditions improved.

would have been considered adequate to illuminate and ventilate the building.

During war-time this was not enough, as an urgent demand for the plant's products necessitated better-than-average working conditions. It was felt that improved illumination and ventilation would pay for themselves through higher efficiency of workmen, improved quality in the product, and a reduction in rejects.

Engineers studied the problem and came to the conclusion that fluorescent lighting and proper air-conditioning would afford the only answer. Even then, much remained to be solved.

The vast floor areas, containing numerous obstructions, would make it difficult to distribute light and air evenly.

Without proper distribution of light, precision work would be slowed by eye strain resulting from glare, shadows, and under-lighted spots.

The lighting problem in this ordnance plant was solved by installing *six miles* of fluorescent tubes along the ceiling of the shop. Here was adequate light—perfectly distributed.

Air Distribution Problem

Similarly, without proper distribution of air, production would be lowered by drafts, under-cooled spots, over-cooled spots, and stagnant air pockets that would defeat the purpose of air-conditioning. That is, temperature and humidity would be unequalized throughout the building, causing the workers discomfort and thereby lowering their efficiency. Drafts would subject them to such ailments as the common cold — the cause for more than one-third the number of days lost in American factories, according to an extensive survey of the American Medical Association.

The air-distribution problem in this ordnance plant was solved by spacing efficient air-diffusers at regular intervals between the rows of fluorescent light tubes. Conditioned air then entered the building through these devices at *792,000* cfm and was distributed so evenly that no drafts were perceptible to workers.

Most manufacturers are now familiar with modern lighting methods and know that proper illumination can increase plant efficiency. On the other hand, many manufacturers are not as well posted about ventilating and do not realize the importance of proper air-distribution.

Properly distributing conditioned air would be a simple matter if a duct the same size as a room were

practical. Air, at desired room temperature, could then be passed through the duct at a low velocity and would push existing air out of the room without causing drafts.

Desired Temperature and Humidity

Since this is obviously impractical, air in small ducts must be reduced in temperature, and duct-velocity must be increased to establish the desired over-all room temperature. Cold air then enters the room and, as its velocity expends, mixes with the warmer room air. The desired over-all room temperature and humidity is thus theoretically established.

If incoming air enters the room through ordinary grilles, registers, or perforated panels, it sweeps from these fixtures in a cold blast. Under such conditions, after the sweep of air is detoured about the room by the various objects it encounters, it eventually expends its velocity, and *then* mixes with the warmer room air. As a result, most of the room air is drafty and turbulent.

Once the velocity is expended, cold air settles to the floor and warm air rises to the ceiling. The over-all result is a drafty room containing many over-cooled spots, as many under-cooled spots, and too many stagnant air pockets.

At the ordnance plant previously mentioned, such undesirable conditions were eliminated by the premixing of incoming duct air and room air *within* Anemostat air-diffusers *before* the mixture was circulated.

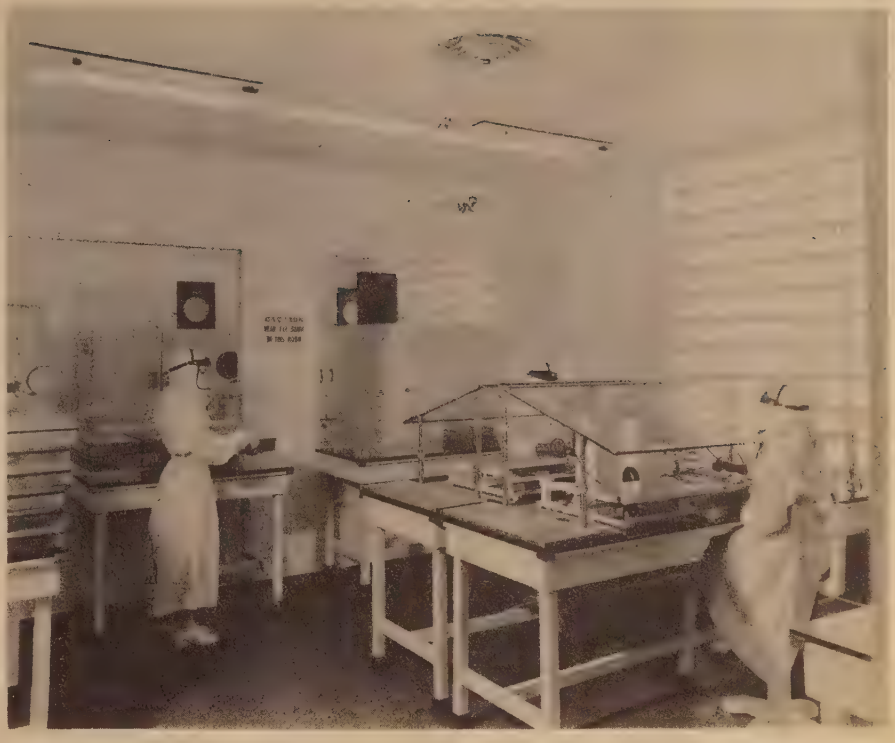
The Air Diffusers

An Anemostat is a patented device composed of a series of conical-shaped members scientifically assembled in definite relation to each other. The unique design of the cones reduces the velocity of incoming air and, at the same time, siphons a volume of room air — equal to about 35 per cent of the incoming air—into the diffuser.

The mixed air then leaves this ceiling-type device at a low velocity and covers a predetermined area near the ceiling before settling in a slowly moving "pressure blanket" on the room air below the fixture.

Since velocity reduction and air mixing takes place *within* the diffuser, and since all air turbulence is limited to its immediate vicinity near the ceiling, no drafts are preceptible to occupants of the room.

Various air-distribution problems are solved by these devices, and to

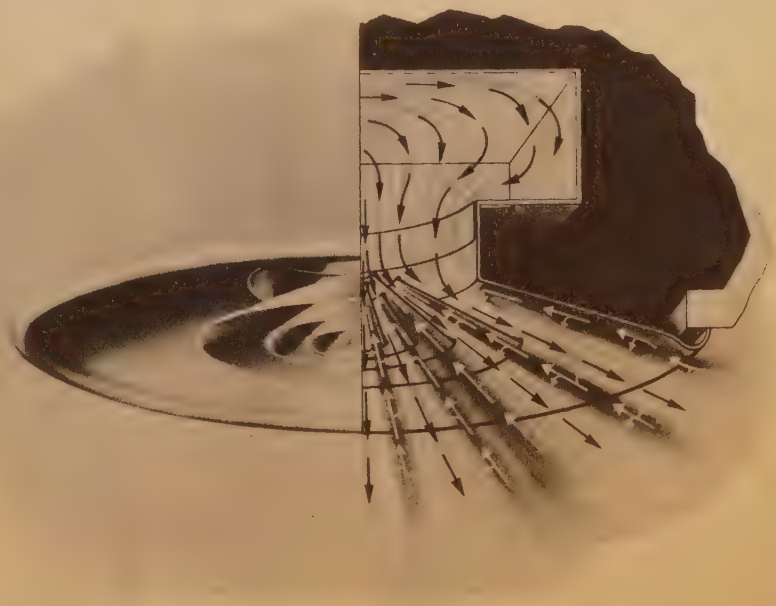


In this penicillin plant draftless and uniform distribution of "sterile" conditioned air equalizes both temperature and humidity throughout the room.

date about 1,000,000 of them have been installed in heating, ventilating, air-conditioning systems of all kinds.

An example of one of these problems is found in the shipping room of the Bowman Dairy plant, at River Forest, Ill., where two ceiling-type unit coolers discharged air through conventional horizontal grilles in such blasts that employes could not endure room temperature of 50°F., even though a lower temperature was required for proper operation of the plant. Here was an otherwise excellent air-conditioning system that failed simply because of inefficient air-distribution.

The unsatisfactory conditions were easily rectified by replacing the grilles with suitable air-diffusers.



The anemostat draftless air-diffuser siphons room air into its cones for pre-mixing with incoming conditioned air and then circulates the mixture. This pre-mixing and subsequent draftless diffusion permits the use of higher temperature differentials between incoming air and room air.

Anemostat air-diffusers and adequate light insure ideal working conditions in this drafting room of the International Business Machines Corporation at Endicott, New York.

Thus, the cold air blasts were eliminated, temperature and humidity were equalized throughout the room and working conditions were greatly improved—even though room temperature was reduced.

Proper Air Distribution

Proper air-distribution is vital to the new penicillin plant of Commercial Solvents Corporation at Terre Haute, Ind. All air supplied to the "sterile area" of the plant is washed, cooled, filtered, and ultra-violet irradiated. Perfect distribution and diffusion of this sterile, conditioned air is important for several reasons.

The manufacture and packaging of penicillin requires close control of temperature and humidity. Dust-carrying drafts must be eliminated to maintain aseptic conditions. In addition, workers in this plant's sterile area must wear a complete covering of heavy, sterile garments.

With Anemostats distributing and diffusing this sterile air, no drafts, under-cooled spots, over-cooled spots, or stagnant air pockets exist to prevent or disrupt aseptic conditions. And workers wearing the complete covering of heavy garments are assured maximum comfort because of the equalization of temperature and humidity throughout the rooms in the area.

These diffusers make it possible to distribute air throughout a room at low velocity, even when unusually high velocities are employed in ducts. At the International Business Machines Corporation plant in Endicott, N. Y., duct velocities vary from 900 to 1200 feet per minute. Yet velocity readings taken at the occupancy levels of rooms equipped with Anemostats do not exceed 40 feet per minute.

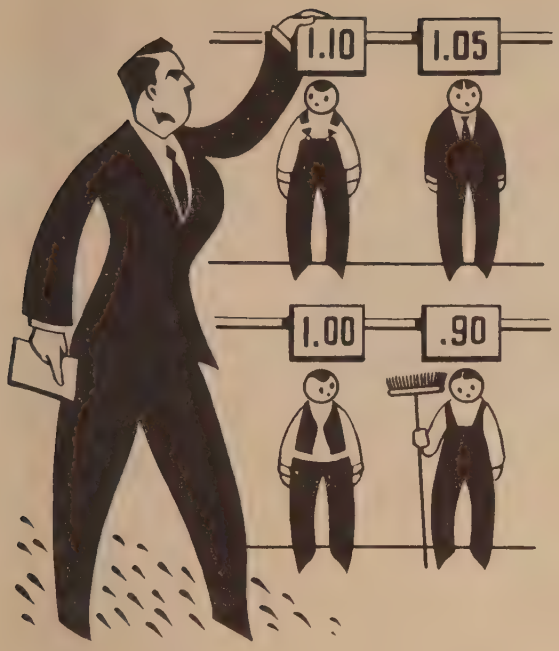
Small Ducts Carry High-Velocity Air

Obviously, small ducts carrying high-velocity air will furnish the same volume of air as larger ducts carrying low-velocity air. Since efficient air-diffusers circulate air of the highest duct velocities in a draftless pattern, these devices make it possible to install smaller ducts to handle larger volumes of air. Duct layouts also may be simplified because efficient air-diffusers thoroughly distribute the air, in spite of machines and other obstacles.

Conditioning and distributing smaller volumes of extremely cold air, instead of larger volumes of air refrigerated to a lesser extent, means that smaller conditioning equipment may be installed.

Small ducts, simplification of duct layouts, and smaller conditioning equipment result in a reduction of the installation and operating costs of an air-conditioning system.

Peace-time manufacturing executives have learned much from war-time air-conditioning installations. They now know that an air-conditioning system is no better than its air-distribution. They also know that a good air-conditioning system is a sound investment in an industrial plant, for many manufacturers are increasing profits through such installations.



PART VIII

Job Evaluation In Cost Control

BRIEFED: This is the eighth in a series of articles on Cost Control and points out factors of job evaluation. Job evaluation methods work best, the author points out, where employes are familiar with the method being used.

by Bert V. Tornborgh, C.P.A.

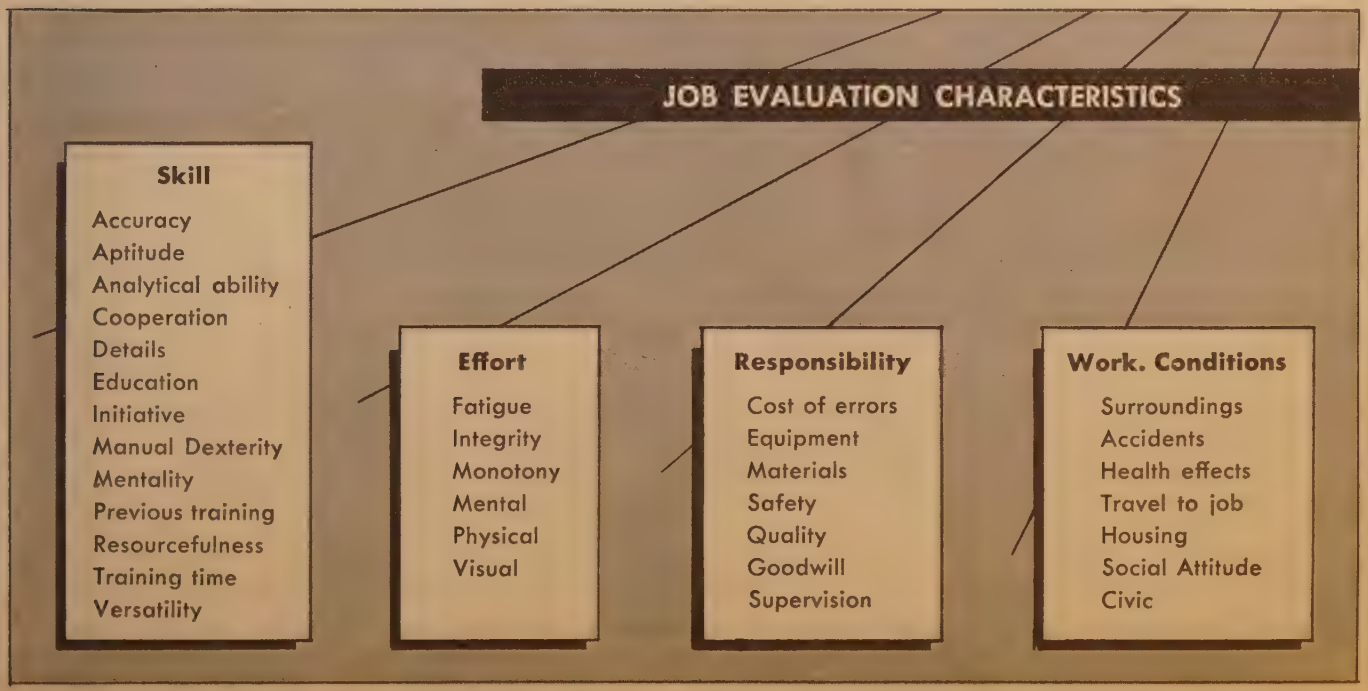
NO business man would dare pay $1.10 for an article which he could normally buy for $1.00. As a matter of fact it would be almost impossible to do this nowadays with modern purchasing methods and up-to-date accounting procedures. However, this situation is not the same regarding labor. There are many instances where $1.00-an-hour work is paid for at the rate of $1.10 and, of course, vice versa. There are also many instances where identical work carries a number of different rates, as the experienced shop man well knows.

Job evaluation, which is an attempt to place the value of each job on a somewhat scientific basis, is actually an orderly grading of job peculiarities and characteristics, so as to achieve a ranking that reflects the intrinsic worth of each job in relation to all other jobs.

The primary step in job grading in a shop is to determine logical job groups by operations or departments, and then to decide upon either the key job within that group or what appears to be the "highest" or "lowest". Whichever one is selected, it will serve as a base for the grading of the jobs either above it or below it, via a consideration of each job's characteristics in comparison with the "base job".

Grading of Jobs

For example, a job that requires exactly the same performance as the "base job" plus a small measure of additional experience or training should be graded slightly higher than the base job itself. This grading job is often done by experienced



job analysts. Uusually department heads and key personnel, as well as union representatives, constitute a job grading panel. A practical approach is to write out cards for each job, sort them according to the grading agreed upon by all the members of the panel, and then note on each card the grade designation.

Since all principal job characteristics must have adequate consideration and since the cards should all be reviewed in order to evaluate properly composite job traits, it is advisable that members of the grading panel all evaluate the traits as they see fit. If there are a sufficient number of qualified persons on the panel, it will be found that a good cross section of trained opinions can be obtained, as far as the weighting of each particular job trait goes.

It will be found that the common items in job grading resolve themselves into: (1) skill; (2) effort; (3) responsibility; (4) working conditions. (See Fig. 18, schedule on Job Evaluation Characteristics.) These are the factors to evaluate in assigning work-ratings to individual jobs, but a segregation into various groups under each of these basic points will facilitate an accurate appraisal. Care should be taken not to become over-involved in breakdowns, since their value has proved to be largely theoretical.

The methods designed by the National Metal Trades Association, the American Management Association, and the National Electrical Manufacturers Association have been found quite practical.

Gradings are generally expressed in percentages or points and weighted according to one of the several methods in vogue. Although space limits us here, there are many excellent reference works on the subject.

The Rate Setting

The primary task in setting up a pay scale is to ascertain a normal pay for the base job. Naturally, what is currently paid in the locality for similar work is considered a good criterion. Whichever figure is decided upon becomes known as the fundamental base rate. It is a shop-by-shop problem to pin down that base; it will be found that it is altogether impracticable to set industry-wide figures.

Consequently, pay scales can hereafter be expressed in either cents per hour or percentage of the fundamental base rate for the key job. Brackets between individual job grades are very rarely less than two cents per hour, and often an additional margin is provided to permit recognition of merit without formal reclassification or promotion. This establishes "individual differentials" which are a very important factor in job grading. (See Fig. 19, "Rate and Grade Sheet on Hour Rates".)

A very effective tool in labor cost control is the bonus system under which the worker is given a stake in economies effected as a result of increased output per man, improved quality or reduced overhead. To a large extent this type of plan puts employes on their mettle, with a minimum amount of supervision and pace-setting.

Since it is not within our province to discuss the merits and operating methods of the many different systems of wage incentives that have been evolved in the course of time, reference should be made to articles published in MILL AND FACTORY or to any one of a number of excellent books on the topic.

It has been the experience of many firms which use job evaluation methods that they work best in those cases where employes are familiar with the method being used. After all, "Knowledge is power", and the workers feel that they are being entrusted with information which they need. The result of this will be that output will be increased, less friction between workers will arise, and in general, employe morale will be raised to its utmost. As a practical matter, it has been found best to post in the personnel department the various weights of the factors used in grading jobs.

A-1 MACHINE WORKS
Rate and Grade Sheet on
Hour Rates

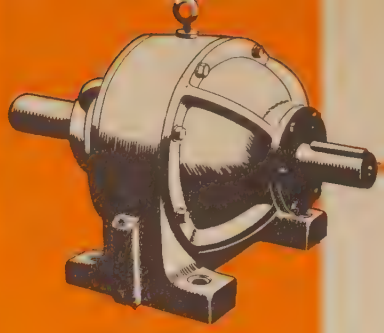
JOB DESCRIPTION	POINTS					BASE CLASS	PER HOUR 1.05 CONV.
	SKILL	EFFORT	RESPONSI-BILITY	WORKING COND.	TOTAL		
Toolmaker, shop	44	43	8	4	99	100	$1.05
Toolmaker, gang-leader	47	46	11	2	106	106	1.11
Shop Machinist	39	41	12	4	94	94	.99
Pipefitter(1)outside	27	39	10	15	91	91	.96
Power Hse. Engineer	25	39	23	15	102	103	1.08

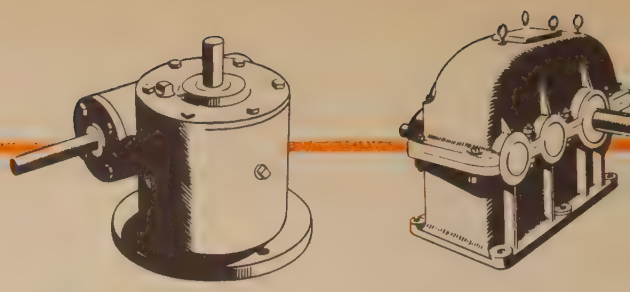
MAINTENANCE OF GEAR DRIVES

FEBRUARY 1947

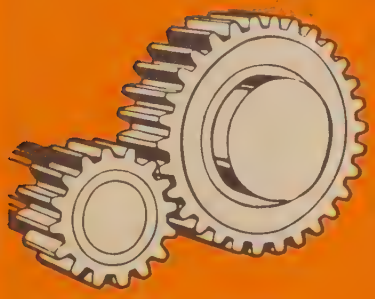
MILL & FACTORY MAINTENANCE MANUAL No. 18

MAINTENANCE OF GEAR DRIVES



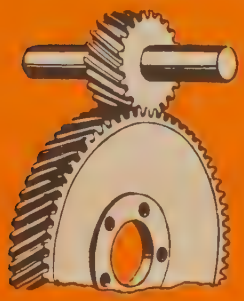


TYPICAL GEARS



Spur-external

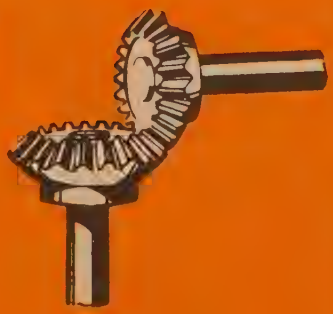
Spur-internal



Helical

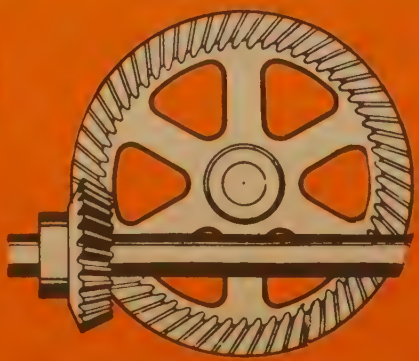
Herringbone

Spiral bevel



Mitre

Worm



GEAR DRIVES

There are many gear designs and arrangements used in the transmission and speed conversion of power drives. Some of the common forms of gearing are spur, helical, herringbone, bevel, hypoid and worm, and variations and combinations of these gear types.

In spur gears, the teeth are on the inside or outside surfaces of cylinders and run parallel with the axes of the gears. They are used where the shafts of the driver and the driven components are parallel.

In helical gears, sometimes called spiral, the teeth are also on the surface of cylinders, but they wind around them in spiral form rather than parallel to the axis shaft. Helical gears are commonly used when the drive and the driven shafts are parallel or at right angles, or any other angles, to each other, but are non-intersecting.

Herringbone gears are double helical gears in which the teeth are "V" shaped. This arrangement of the gear teeth counteracts any end thrust produced "when helical gears are used to connect parallel shafts."

Bevel gears have their teeth on pairs of cones which mesh so as to transmit power between two intersecting shafts, and occasionally shafts which do not intersect. In a straight tooth bevel gear, all gear teeth planes intersect the axis of their respective cones. If the teeth are of the helical type, the gear is called a spiral bevel. Miter gears are bevel gears in which both center angles are 45 deg.

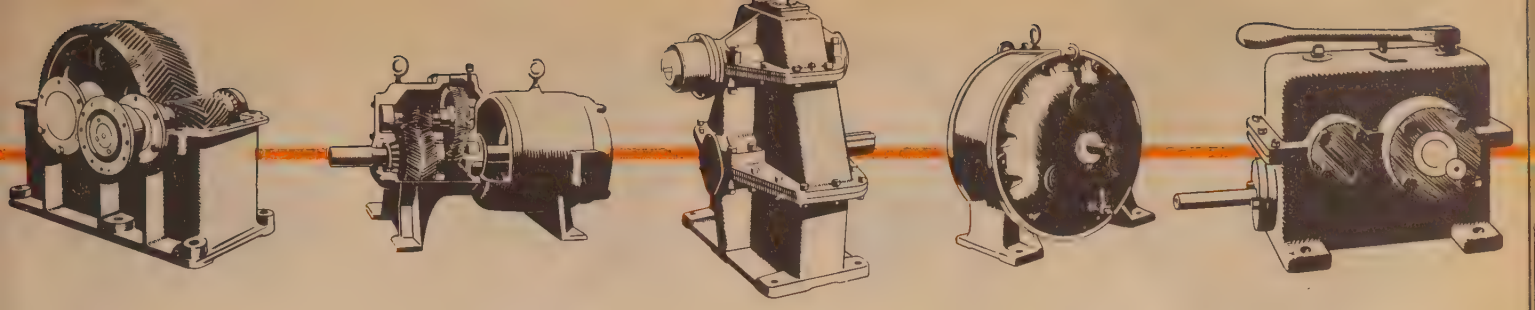
A hypoid gear is a special kind of skew bevel gear used when the axis of the gear shaft and that of the pinion are not in the same plane.

In a worm gear the teeth of the worm wind around the shaft cylinder and mesh with the teeth on the gear which are specially cut to mesh with the worm teeth. With worm gears high speed-reduction ratios are obtainable between the shafts, the axes of which are contained in planes which are at right angles to one another.

SELECTION

Careful consideration should be given to the selection of the right gear drive for the specific operating conditions of each installation. In this connection the manufacturers of gears and gear drives should be consulted for their experienced recommendations.

Among the factors to be considered in selecting the right equipment are the following: the load characteristics — whether steady or shock; the kind of duty — daily hours of operation and whether continuous or intermittent; kinds of driver and driven machines — and horsepower of former and that required by the latter; and the form of reducer drive.



ENCLOSED GEAR DRIVES

Enclosed gear units carry such names as speed reducers, speed increasers, gear boxes, gear cases, reductors and the like. Motor reducers, gear motors and other like-named speed reducers built into motors also belong in this group.

In these self-contained, power-drive units the gears are accurately installed, aligned and cased in an appropriate housing by the manufacturer at his factory. Thus, many of the difficulties encountered in the installation, operation and maintenance of open gearing are greatly minimized and in some instances actually eliminated.

In other words, the makers of enclosed gear drives furnish compact, completely packaged gearing units for all manner of drive, speed conversion and power transmission applications.

The great majority of gear drives operate with remarkable efficiency. Nevertheless, most manufacturers of gearing issue instructions on the proper use, installation, alignment, lubrication, care, and other maintenance practices for their equipment. These instructions should be studied and followed carefully.

FOUNDATIONS

Great care must be exercised in handling gears and pinions of all kinds in order to prevent distortion or other damage to the machine and the gear teeth. This precaution should be observed at all times and under all conditions.

Because of their housings, enclosed gear drives are, of course, considerably protected from dirt and dust and abuse of many kinds. They should, therefore, not be taken apart, thereby permitting dirt to get into the unit. Neither should any slushing compound in the gear units be removed until they are about to be installed.

Foundations for speed reducer installations should be rigid and substantial enough to prevent vibration and to maintain alignment. The most satisfactory foundations are those of concrete, masonry or structural steel. If properly and rigidly designed and constructed, wood framework or timber may be used.

Be sure to follow the manufacturer's instructions for the erection, and installation of their units. The section on alignment gives suggestions on the ways and means for attaining and maintaining correct alignment.

Since vibration tends to loosen bolts and nuts, they should be inspected periodically and tightened whenever necessary.

ALIGNMENT

Accurate alignment of gear drives is most important. Misalignment develops unusual stresses and overloads. Excessive wear on the coupling is a positive indication of misalignment.

A flexible type coupling, rather than a rigid one, should be used between the prime mover and the reducer in direct drives. Transmission chains and belting are also used for transmitting the mechanical power between the driver and the reducer or the gearing and the driven unit.

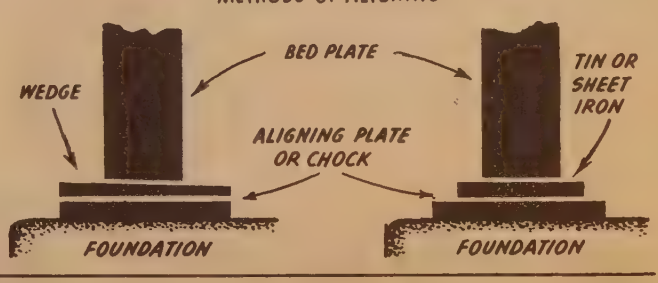
Secure mounting on a rigid foundation is essential to proper alignment. Another aid to maintaining alignment is a bed or base plate for the support of both the motor and reducer. These can be supplied by the manufacturer of the gearing or be constructed locally.

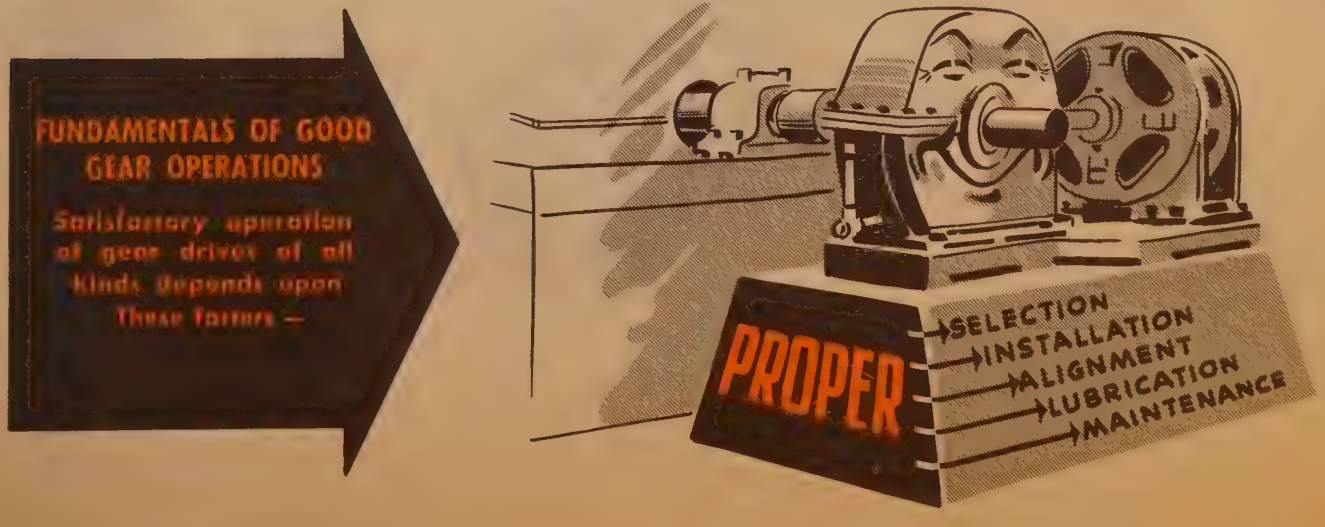
Even when bed plates are supplied, care should be taken in setting up the installation.

One easy way to level up the bed plates is to use small steel plates which can be shimmed up with thin pieces of metal.

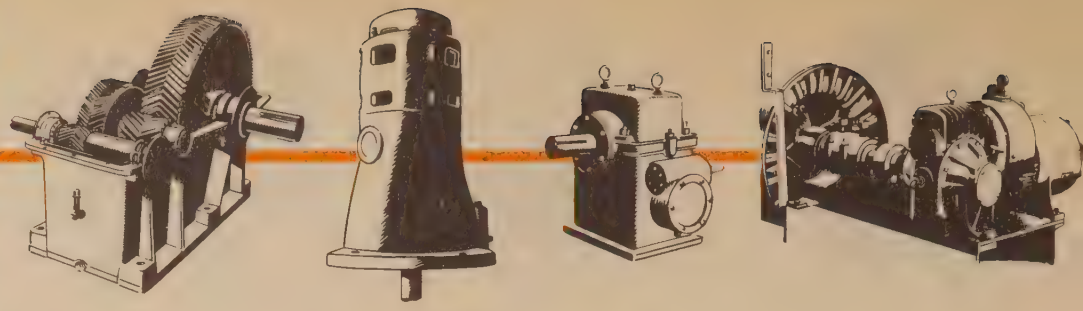
Coupling alignment can be checked with a leaf gage and a straight edge.

METHODS OF ALIGNING





MAINTENANCE OF GEAR DRIVES



OIL LUBRICATION OF ENCLOSED GEAR UNITS

The recommendations on this page cover the lubrication of enclosed gear units of all types within the range of sizes of commercial enclosed gear drives.

LIMITATIONS

They are applicable to enclosed gear drives in which the high-speed shaft rotates within a nominal speed range of 600 to 1,800 rpm. One exception to this is high-speed gear units which normally operate at speeds higher than 1,800 rpm. The recommendations for these are shown in Table II.

For spur, helical and herringbone gearing, the recommendations as shown apply only to gears cut after heat-treatment. If they are heat-treated after cutting, the next higher AGMA lubricant number is to be used for a given unit size and ambient temperature.

The recommendations as shown for units using straight or spiral bevel gears are for gears heat-treated either before or after cutting.

MAINTENANCE

1. To obtain long life from a gear unit, it is necessary that the oil be clean and free from sludge at all times. To be assured of this, the oil must be changed at regular intervals.

2. For a new unit the oil should be drained at the end of two weeks of operation and the case thoroughly flushed with light flushing oil. For refilling, the original oil can be used if it has been filtered, otherwise new oil must be used. After this, a change of oil every 2,500 hr of operation or every six months, whichever occurs first, is sufficient for units operating under normal conditions. Where operating conditions are severe, such as a rapid rise and fall in temperature of the gear case with accompanied sweating of the inside walls and resulting formation of sludge, or where operation is in moist or dusty atmospheres or in the presence of chemical fumes, it may be necessary to change the oil at intervals of one to three months.

3. Sludge in gear units may be caused by metallic particles ground off the gears, from dust and dirt and by the presence of moisture or chemical fumes. Therefore, every precaution should be taken to prevent water and foreign particles from entering the gear case.

TABLE II — RECOMMENDED LUBRICANTS FOR ENCLOSED UNITS OF ALL TYPES EXCEPT WORM GEARS

Types of Units	Size of Units	Ambient Temperature, deg F.		
		0-40 use AGMA No.	41-100 use AGMA No.	101-150 use AGMA No.
Parallel shaft units	Low-speed, Centers up to 20 in.	2	4	5
	Low-speed, Centers over 20 in.	3	5	6
Planetary gear units	O. D. of housing up to 16 in.	2	3	4
	O. D. of housing over 16 in.	3	4	5
Gearmotors	All sizes	2	4	5
Spiral or straight bevel gear units	Cone distance up to 12 in.	2	4	5
	Cone distance over 12 in.	3	5	6
High-speed units	All sizes	1	2	3

TABLE III — RECOMMENDED LUBRICANTS FOR ENCLOSED WORM GEAR UNITS ONLY

Service and Worm Speed	Ambient Temperature deg F.		
	0-40 use AGMA No.	41-90 use AGMA No.	91-12 use AGM No.
Intermittent operation *All worm speeds	5	5	7 Comp
Continuous Operation Worm speeds below 600 rpm.	7 Comp. **Diluted	8 Comp.	8 Comp
Continuous Operation Worm speed 600 rpm. and over	7 Comp. **Diluted	7 Comp.	8 Comp

*Where period of operation is insufficient to produce any appreciable rise in oil bath temperature.

**Diluted AGMA No. 7 Comp. oil should be diluted with a lighter oil, preferably not exceeding 500 sec. viscosity at 100° F. until the desired fluidity is obtained. The lubricant used for dilution should be of the same basic crude as that of the recommended oil. The lubricant supplier should be consulted if there is any doubt.

OIL LUBRICATION OF OPEN GEARS

The recommendations on this page cover the lubrication of open and semi-enclosed gearing of all types.

They are applicable to gears operating at moderate and slow speeds. The maximum permissible speed is that at which the lubricant will adhere to the teeth and will vary with the application and operating conditions.

This part covers oil lubrication of gears as distinguished from grease lubrication. The oil used may, however, contain special additives to increase its adhesiveness.

METHODS OF LUBRICATION

Various methods have been devised for the lubrication of open gearing because of the wide range of applications in which they are used. These methods can, however, be grouped in two general classes which are as follows:

(A) SLUSH-PAN LUBRICATION

This method of lubrication is recommended for high grade heavily loaded gears operating at moderate and slow speeds. It involves the use of a slush pan mounted below one of the gear elements in a position such that a number of gear teeth are submerged in oil. As the gear rotates, a small amount of lubricant clings to the teeth and is carried into the mesh.

The oil used should be of a tacky nature so that it adheres well to the tooth surfaces. It should be heavy-bodied but not so heavy as to channel in the pan.

(B) HAND LUBRICATION

Hot — by brush or pouring

On applications where a slush pan is impractical, this method of lubrication is recommended for moderate speeds and heavy loads or when gears are operating at elevated temperatures. It consists of heating the lubricant to a temperature such that it flows freely and is then applied to the gears with a brush or by pouring. An extremely adhesive lubricant should be used.

Cold — by brush or pouring

This method of lubrication is recommended only for slowly moving and roughly cut or cast teeth carrying comparatively light loads. It consists of applying the lubricant to the gears with either a brush or paddle. The oil used should be adhesive in nature so it will stay on the teeth.

Hand-Oiled

This type of lubrication is limited to small gears which are used principally for motion transmission where the loads are very light. The oil is applied by merely pouring on the gear teeth.

MAINTENANCE

1. Because open gearing comprises so many types and is used under such a wide range of operating conditions, it is difficult to make recommendations applicable to all situations. Often such gears are protected by dust-excluding sheet metal housings while others have no covering.

2. For slush-pan lubrication, the oil should be changed once every six months for applications where it is not subject to dust or contamination. Where dust or an excessive amount of moisture is present, the oil should be changed every two to four months.

3. All hand-lubricated gearing depends on the periodic application of oil to the gears to maintain a constant film. The frequency of application depends on speed, load, and operating condition and may vary from one hour where speeds and loads are high to 24 hours for lightly loaded slow-speed drives. The proper intervals between applications can be determined only by inspection of the tooth surfaces.

4. Gears operating in dusty atmospheres should be periodically cleaned with kerosene or other suitable solvent. The dirt and grit adhering to them can seriously damage the tooth surfaces if it continuously passes through the mesh.

TABLE IV — RECOMMENDED LUBRICANTS FOR OPEN GEARING OF ALL TYPES EXCEPT WORM GEARS

Method	Ambient Temperature, deg F.		
	0-40 use AGMA No.	41-100 use AGMA No.	101-150 use AGMA No.
Slush pan	3	5	6
Hot — by brush or paddle	10	10	11
Cold — by brush or paddle	6	8	10
Hand-oiled	4	6	8

TABLE V — RECOMMENDED LUBRICANTS FOR OPEN WORM GEARS ONLY

Method	Ambient Temperature, deg F.		
	0-40 use AGMA No.	41-100 use AGMA No.	101-150 use AGMA No.
Cold or hot — by brush or paddle	6	8	—

GEAR TOOTH WEAR AND FAILURE

Gear tooth wear and failure in operation may result from the following conditions:

a. Incorrect center distances resulting in insufficient root clearance and backlash.
b. Misalignment; excessive shaft deflection; defective related parts, worn bearings, etc.
c. Incorrect or insufficient lubrication.
d. Foreign matter in lubricant and between teeth, such as abrasive dirt or particles of metal worn from teeth.
e. Excessive temperatures.
f. Excessive loads, or shock loads.
g. Vibration.
h. Excessive speeds.
i. General abuse.

To avoid misunderstanding regarding the terms used to explain the different types of wear and failure in gearing, the American Gear Manufacturers Association has issued the Standard Nomenclature described on the following page.

In many cases there is a marked similarity which may be a matter of degree or roughness, such as abrasion and scratching. Furthermore, some kinds of wear may be of a minor nature at the start, but if the wear continues, more severe conditions may occur. An example of this is scoring which may lead to galling, seizing and welding, if the conditions causing the wear become serious.

OF GEAR DRIVES

GEAR TOOTH WEAR AND FAILURE

	NATURE	CAUSE	EFFECT
ormal ear	Gradual smoothing and polishing of working surfaces.	Sliding or rolling action of the teeth.	Wear practically ceases after a "running in" period, if gears are properly designed, manufactured, and operated.
itial ting	Pits of pin-head size, or smaller, tooth surfaces in vicinity of pitch line.	A gradual occurrence frequently during initial period of gear operation.	Not detrimental, if gradual and unless it goes beyond initial stage. May disappear with normal wear.
ogressive ting	Continuing formation of pits in increasing number and size.	Continued operation at relatively high load, and overloading.	When unpitted areas of teeth can no longer carry the load, destruction of the tooth shape may occur.
brasion	Fine scratch marks up and down tooth profile.	Foreign matter—dirt, grit, metallic particles in lubricant; breaking down of material on tooth surface (cast iron); or lack of proper lubricant.	General, rapid wearing away of tooth surface.
ratching	Deeper and more widely separated marks than those of abrasion.	Comparatively coarse particles carried between engaging tooth surfaces.	General, rapid wearing away of tooth surface.
coring	Roughened tooth surface, sometimes on small areas only and at the same position on all teeth.	Excessive loading or inadequate lubricant.	General disintegration of surfaces may result from metal-to-metal contact. Sometimes eliminated in initial stages by applying more effective lubricant, such as general purpose E.P. (extreme pressure) type.
alling	Aggravated condition of scoring — sometimes referred to as seizing and welding.	Particles of metal torn out of the tooth surfaces. Generally occurs when two soft gears of same hardness operate together under heavy load conditions.	General distintegration of surface may occur.
urning	Discoloration of tooth surfaces of type associated with high temperatures.	Excessively high temperature which may result from over-speed, over-load, or faulty lubrication.	Reduction in hardness of hardened steel gear teeth and worm threads so that they cannot carry the load.
olling nd eening	Plastic flow of tooth surfaces. Scoring may or may not be present. Rolling — when load is heavy and continuous. Peening — "hammer blows" when load is intermittent.	When material in gears is ductile in compression and of insufficient hardness.	Formation of slight "fins" at the top edges and ends of teeth.
racking nd hecking	Cracking — single or scattered cracks in tooth surfaces. Checking — numerous and closely grouped cracks in surfaces. Frequently detection is only possible by etching or by "magnaflux" method.	Cracking — excessive temperature fluctuations from loading and lubrication conditions. Checking — several: direction and arrangement indicate probable cause.	Cracking does not necessarily result in failure.
hipping	Breaking off of material at edges or boundaries of the teeth. Sometimes called "spalling."	Excessive brittleness when occurring under normal load.	Broken teeth and gear failure.
ouging	Gouging of material near roots of pinion teeth by top edges of gear teeth. Similar occurrence between edges of hardened worm thread and teeth of worm gear.	Interference between flank of driving pinion and tip of driven gear, in unhardened gears.	Wearing down of gearing and loss of effectiveness.
Overload nd reakage	Tooth breakage.	Unexpected shock or overload, such as from jamming of other machinery.	Failure of gear—not attributable to improper design or faulty manufacture.
atigue nd reakage	Tooth breakage, usually possible to ascertain from the character of the surfaces of the fracture.	Repeated loadings characterized by cracks at highly stressed locations which extend in area and depth until failure occurs.	Breakage of teeth after a large number of load repetitions — not from overload breakage.

Keep a complete set of these useful Maintenance Manuals in your file. Reprints may be obtained by sending 10c each to MILL & FACTORY, 205 East 42nd St., New York 17, N. Y. Special permanent binders will be supplied for $1.50 extra.

Conveyor Installation Saves 39,000 Man-Hours Annually

By R. Raymond Kay

View from one end of conveyor.

A TABLE type conveyor has been installed in the Material Preparation Department of North American Aviation, Inc., Inglewood, Calif., to move sheet metal through the sequences of layout, drilling and routing operations.

Previously the fabrication method was to lay out the material by placing six to ten 4′ x 12′ sheets of metal on an "A" frame truck, wheel the truck outside, rough outline the parts on the metal by spray painting through paper templates, then return the material to the department and store it in racks.

The material was moved from the rack to the drill table where the drill templates were applied, pilot, tooling, and other holes were stack drilled. The material was then stored on trucks and in racks to await the routing operation. When it was moved onto the routing table, the routing templates were applied, secured by lag screws through the template and material into the plywood topped table. The parts were routed, removed, placed on trucks, and moved to the de-burring rolls.

To perform three operations, heavy bulky material had to be moved six times and stored four times. Drilling and routing machines were idle more than 50% of the time while material was being obtained, set up, and unloaded. Trucks obstructed the aisles so that trucking through the department was practically impossible.

The new method uses a 22-station intermittently moving conveyor. At the first station of the conveyor the 4′ x 12′ sheets of material in quantities of six to 10 sheets are loaded onto a 4′4″ x 12′4″ conveyor table by use of an overhead crane. At station two the rough outline of the parts to be obtained from each sheet are marked on the metal by spray painting through pre-punched paper templates.

The next four stations are assigned to drilling, lag screwing the material to the table top, applying the drill templates and pegging them into position by inserting the pegs through the drill templates into two previously drilled ¼″ holes in each part outlined on the material. These pegs secure the drill templates in the proper location.

Pilot, tooling, and all other holes are drilled in the next four positions with high cycle pneumatically fed radial arm drill presses. Drill templates are removed and router templates applied and secured with lag screws at the next two stations.

In the following seven positions, odd shaped parts are profiled to size by moving the cutting tool on the high cycle radial arm routers around the outline of the templates.

Routers, as are drills, are equipped with a central lubrication system which lubricates the tools, increasing production and decreasing tool wear. Air nozzles on the routers throw chips against a shield and the chips fall onto a belt conveyor which deposits them in a scrap truck.

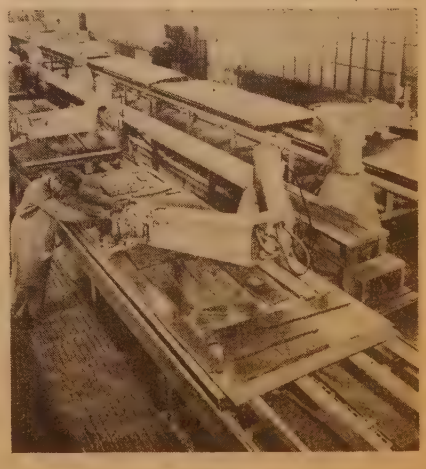
The router templates are removed at the third from the last station and placed on an overhead conveyor which returns them to the applying station. Both drill and router templates are conveyed from the unloading stations to the template applying stations by an overhead monorail which operates automatically.

At the final two stations, the parts are removed from the conveyor and placed on roller conveyors which convey the parts to the de-burring rolls, inspection, and numbering

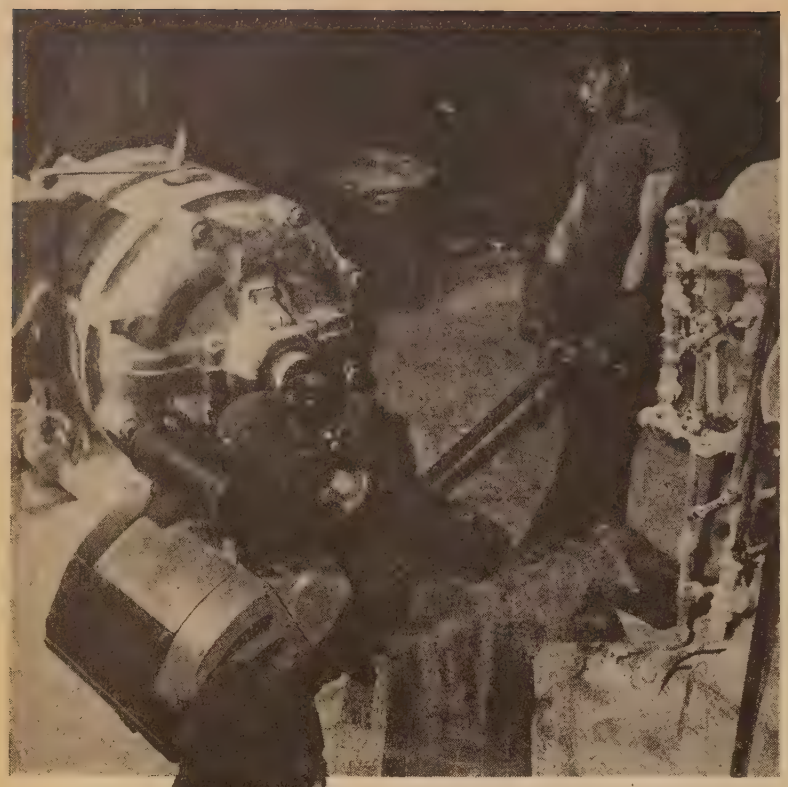
The conveyor moves the parts one station closer completion at 15-minute intervals by moving 14½′ at a speed of 30 fpm. To eliminate any safety hazard, a horn is blown before the conveyor moves.

Before installation of the conveyor, only 20 tables of parts per 10-hour shift were being produced with 41 employes. The day after the conveyor was in operation 38 tables of parts were produced with 26 employes, an increase of 18 tables or parts per shift with 15 less employes, a saving of 39,000 man-hours per year.

Other improvements have resulted. Specialization resulting from each employe repeatedly performing the same operation has reduced drill and router bit breakage; usage of plywood and lag screws has been reduced; machine maintenance costs have decreased, and material is conserved by reducing errors.



Routing operation.



Top—Floor machine is operated by one man whereas manual cleaning required many workers.

Operator exhibits grime removed in five minutes with floor machine.

Modern Floor Cleaning Methods

By T. C. Richards

Plant Engineering Supt., B. F. Goodrich Company (Akron plant)

HOW correct application of mechanical methods in removing hard, incrusted grime from factory floors can boost trucking efficiency as much as 100% (based on pull-tests) has been demonstrated at the Akron plant of the B. F. Goodrich Co.

Tests were made in the hose braiding room of the plant where soilage conditions are typical and have long been a problem to maintenance men. The grime is an inevitable result of processing operations in the rubber industry where powdered soapstone, used in coating hose, combines with dirt, oil and rubber particles. This combination forms a thick adhesive which builds up in successive layers. In consequence concrete floors readily become rough and bumpy, potentially hazardous to fast-moving traffic.

The test area chosen for a pull-test was between two hose braiding machines where six months' accumulation of soilage clung to the floor in bumpy layers one-quarter inch thick. A standard cart, normally used to haul completed hose from one department to another, was loaded to its usual weight of 1430 lbs gross and positioned at an arbitrarily selected point on the floor.

A 500-lb capacity Chatillon scale was connected to the cart to measure the amount of sustained pull required to keep the vehicle in motion on the uncleaned floor. In a careful test the pull required was found to be 40 lbs.

The test area (approximately 140 sq ft) was then cleaned with a heavy-duty industrial floor machine. Soilage obtained from the area was 50 lbs, or 2.8 lbs per square foot.

The hose cart was again positioned as before and the pull-test applied. Result: only 20 lbs of sustained pull were required to keep the cart in motion, indicating 100% easier operation (in terms of needed power) to move the load over the clean floor. In addition the movement of the test cart over the cleaned area revealed improved stability and smoothness, factors suggesting decreased hazards in trucking and reduction in costs for truck or cart maintenance.

Cleaning Methods Inadequate

The difficult soilage conditions which led the B. F. Goodrich plant to abandon manual methods of cleaning, in favor of a heavy-duty floor machine, present a vexing problem. Soapstone and rubber deposits are only part of the story. Plant maintenance men must also contend with oil, grease and steel chips in their machine shops; a soapstone, rubber fragments and liquid soap condition in the press room (with fast buildup and ½" deposits in some areas); and in-

crusted grease and oil accumulations, mixed with tarry substances, in tunnel areas where traffic is heavy.

Originally maintenance men attacked these grime-covered areas with hand scrapers, tediously working over the floors in an operation that required many men and often tied up production. This work, which proved to be expensive, was supplemented by use of air hammers. Another group of men assigned to follow the scrapers and air hammers shoveled loosened soilage into wheelbarrows.

But excessive hand work was found to have other disadvantages apart from cost and interference with plant operation. The chief fault was irregular cleaning, particularly in areas where floor surfaces were somewhat irregular or rough. Here a vigorous wielded scraper had a tendency to gouge, leaving small pits or hollows unsuited to fast traffic. This was found to be true on wood-block as well as concrete.

machine hopper. An 11" fan, direct-connected to motor, creates powerful suction to draw lighter dust and dirt into a heavy fabric bag.

Of the various cleaning attachments available, Goodrich maintenance men chose a 16" accessory which consists of an open "cage" (bearing more than 300 alloy steel rotary cutters mounted on its outer edge) which slides onto the drum of the floor machine. Cutters are loosely mounted so they exert a high speed flailing, pulverizing action. Cutter teeth are heat treated to resist wear. At suggestions of Goodrich floor foremen, a special cutter-tooth "style"—a stocky, blunt edge, was designed which offers good wear resistance in constant use on dirt-incrusted concrete.

Value of New Method

To determine the value of mechanical floor cleaning methods as applied in various departments, the floor machine was operated in representative areas and a record kept of amount of soilage removed. Typical selections are shown in Table No. 1.

In addition to departments mentioned in Table No. 1, an average of 1¼ lbs of grime was removed from each square foot of floor space in the press room, where small gaskets and other units are stamped from rubber stock.

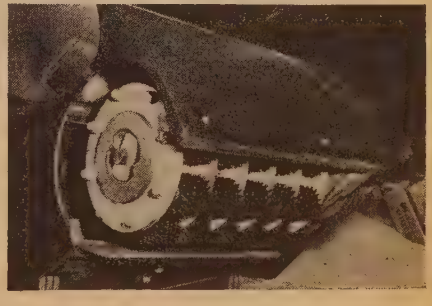
Advantages

Among the significant results of the company's experience with "mechanized" floor cleaning the following points may be cited as recognized advantages:

1. Cleans any floor surface faster than by manual methods.
2. Leaves a cleaner, smoother surface for easier trucking.
3. Does not require use of water, detergents, chemicals or hand scraping.
4. Can be performed without interference with plant operation.
5. Reduces floor cleaning costs by wide margin.

DOUBLES Trucking Efficiency

BRIEFED: This article tells of an experiment in replacing manual floor-cleaning methods with an industrial floor machine in a plant with a difficult soilage problem.



Closeup view shows accessory having over 300 alloy steel rotary cutters.

After prolonged consideration of equipment, a 6 hp heavy duty floor machine powered by a 4 cycle gasoline engine and operated by one man was chosen. Triple V-belt drive from the engine drives a revolving drum at speeds of 800, 1200 and 1500 rpm, depending on accelerator setting. The drum, in turn, has a heavy duty bearing assembly, is dynamically balanced, and is designed to accommodate 16" accessories for various floor cleaning operations.

Supported on two 8" wheels, and with revolving-drum accessory forming a third point of contact with the floor, the machine operates as a "one man maintenance system" in a manner somewhat analogous to that of a self-propelled lawnmower. Action of the revolving cutter, steel wire brush or other drum-mounted accessory cuts grime loose from floor and hurls it into the built-in

Record of Soilage Removed

Department	Floor	Condition	Dirt Removed	Approx. Time
Machine shops	Wood block	Grease, oil & imbedded steel chips	887 lbs from 800 sq. ft.	6 hrs.
Machine shops	Wood block	Grease, oil & imbedded steel chips; between lathes & machinery	630 lbs. from 675 sq. ft.	7 hrs.
Tire curing	Wood block	Soapstone, rubber particles	300 lbs. from 120 sq. ft.	4 hrs.
Hose braiding	Concrete	Soapstone, cotton lint & rubber particles	2623 lbs. from 15,000 sq. ft.	36 hrs. (416 sq. ft. per hr.)

Table #1. Record of soilage removed through use of floor machine.

Type of turntable used for the continuous application of hard-surfacing alloy to digger teeth.

Hard-Surfacing To Improve Wear

BRIEFED: This company makes wide use of hard-surfacing alloys to greatly improve the wear of its products. The alloys are applied by both the electric and gas welding techniques.

HARD-SURFACING offers many opportunities for increasing durability of heavy duty machinery without sacrifice of economy in its manufacture.

Engineers every day are finding new uses for the hard facing treatment in order to retard wear of machine parts subjected to severe abrasion. It enables manufacturers to build industrial equipment and construction machinery that approaches as nearly as possible the service of the One Horse Shay.

Companies building ditch digging, material handling, or asphalt mixing equipment have, for example, a problem in selecting materials that are both tough and hard.

High resistance to shock loads requires ductility and toughness, whereas the severe wear encountered in digging, mixing, and handling of abrasive materials, requires use of an extremely hard metal. The latter necessarily is brittle.

In order to meet the problem, the Barber-Greene Company of Aurora, Ill., which specializes in manufacture of material handling machinery, are using a process of welding a thin layer of wear resistant high alloy steel over softer, tougher metals wherever abrasion occurs.

Thus it obtains the advantages of both at the greatest possible economy. Various other manufacturers have found that durability obtained through hard-surfacing is equal in many applications to that resulting from the more expensive process of heat or cold treating metal.

Hard-facing greatly extends life of machine parts where such abrasive materials as crushed stone, crushed scrap iron, and sand are handled.

Maintenance men of the Barber-Greene Company observe that ditcher teeth upon hard-surfacing wear approximately five times longer than teeth which do not receive this treatment. The teeth in ordinary usage are subjected to the most severe abrasion. They are used in digging caliche, slate, soapstone, frozen ground, and asphalt surfaces. They were found satisfactory even in digging coral rock encountered in Florida.

Paddles of bituminous mixers when hard-faced mix rock and gravel at the rate of 100 tons per hour without undue wear. Also, hard-facing greatly extends the life of steel crawler shoes. Other applications by the Barber-Greene Company include dirt seals, spirals of bucket

loaders, and bucket edges of coal and dirt conveyors.

Having experimented with hard-facing for nearly 20 years, engineers had developed efficient processes with both acetylene and electric welding before the war. However, it required the shortage of high alloy steels to increase greatly the number of applications.

A good rule for all industry might be: wherever a machine part or surface wears prematurely, explore the possibility of hard-surfacing. It may be the answer to a difficult problem. Extra service may be obtained at a relatively small additional cost.

During the War

Hard-facing has proved its value especially where large crews of men depend upon operation of a machine as in road paving and other construction jobs. In addition to wages paid, there is a loss of production. A whole fleet of trucks may be tied up because of a break-down. It is important, therefore, that time for replacement of worn or broken parts be cut to a minimum.

By William Goettler

Insurance against the need for repairs was even more vital during the war. Roads had to be constructed for military traffic, and landing strips paved for emergency airports. Machinery had to operate under all sorts of soil conditions everywhere from the equator to the arctic. Equipment in use for eight hours a day during peace time, operated around the clock. Abuse of machines was certain. Army engineers, as a result, specified hard-surfacing as standard for many machine parts.

Maintenance men of the Barber-Greene Company find, furthermore, that hard-facing of certain parts such as digger teeth, not only increases life of these parts but of the whole machine. Sharp teeth reduce wear of drive shafts, and the load on the power unit. Only about five compounds for hard-facing were available originally, but now metallurgists have developed a surfacing alloy for almost every purpose. The compounds range from common carbon steel to tungsten-carbide, and may cost all the way from $.50 to $5.50 a pound.

The Barber-Greene Company is among heavy equipment manufacturers who continually run tests of different brands and compounds in order to determine where either greater durability or savings in cost may be obtained. The object is to find the most economical compound that will guarantee the service expected. Experience along with the results of tests will indicate which type of rod to use for various purposes. Choice is determined by need for either shock or wear resistance. Hardness of the protecting compound itself, the Barber-Greene Company learned, is not the only factor in increasing life of machinery. Both hardness and toughness in many cases are necessary.

Salesmen of the various brands, having observed experience of other manufacturing plants, can frequently advise engineers in selecting the right compound for each purpose. Results of a tremendous amount of research on compounds are available for almost any hard-facing problem.

Economy

Economy of hard-surfacing, of course, can be overestimated. It can be proven only by observing serviceability of various parts in the field under various conditions. The company found that extra thicknesses of the facing compound didn't necessarily increase satisfactory service. Where metal was deposited in thick layers, points and edges wore blunt. One-sixteenth of an inch is usually the ideal thickness.

Where a narrow bead was applied, wear of unprotected metal occurred just behind the bead. Generally a broad layer of the desired thickness will give the best results. The alloy in many cases is deposited only on one edge so that wear of the softer exposed edge of a digger tooth or blade automatically keeps the tool sharp.

Manpower shortages during the war necessitated streamlining of the operation of hard-surfacing digger teeth at the Barber-Greene Company. Actually the output of welders was stepped up some 500%. Both electric and gas welding methods are used.

With gas welding, digger teeth were placed by a shop helper on a turntable that is revolved according to the welding speed. Thus the welder did not have to shut off his torch each time in order to place a small number of teeth in position.

Production engineers just before the end of the war were seriously considering installation of a fully automatic process using either acetylene or electric welding. Among difficulties encountered was cracking of the alloy under certain conditions, but experience indicated that this did not detract from wear.

Discomfort to workmen because of heat from continuous welding was overcome by supplying them with shields, padded gloves, and the best electrode holders. Ventilating fans were installed to remove smoke.

The process of hard-facing is much the same as any other welding. When applying "Stoodite," for example, reverse polarity is used, and amperage and voltage is controlled by rod sizes. Current rods become red hot, causing difficulty in application of the metal. These are replaced for cooling, and the welding process is continued until a particular job is finished.

Digger teeth and plates being hard-surfaced are placed at the proper slant so that metal flows downward at a rate which leaves the proper thickness of the coating. The degree of incline is about 30%.

Voltage and amperage are prescribed for various rods by manufacturers. However, the welder usually finds a variation of five or ten amperes necessary. Bucket teeth and plates are faced before welding in order to remove all forging scale which might cause the hard-surfacing compound to peel off.

The digger teeth as they are installed in the digging machine.

Ideas FROM INDUSTRY

New and Improved Methods Being Used By Industry

HOIST CLINIC FOR INDUSTRY

Industrialists in and around Erie, Pa., were given an unusual opportunity to learn about the latest designs in hoisting equipment at a 'clinic' held by the H. P. Weller Supply Company, industrial distributors, in cooperation with the Manning, Maxwell and Moore Company. For a period of three days industrialists were invited to bring their lifting problems to the clinic and discuss them with the four hoisting engineers present. An extensive display of hoisting equipment was exhibited, so that the visitors could actually see this modern equipment and operate it. In addition to personal invitations, newspaper advertisements were used to cover the field more widely.

Mr. H. P. Weller, President of the Weller Supply Co., is shown at the extreme right of the photograph, with him are the engineers from the hoist company who were present at the clinic. The insert shows a portion of the hoist display.

ROTATION OF SAFETY COMMITTEE MEMBERS

The twice-a-year rotation of men as members of the plant safety committee has been a major factor in keeping to a minimum the frequency and severity of accidents at the Ambridge, Pa., plant of National Electric Products Corporation. Early in January and June of each year, Dave Woods, personnel and safety director, requests department foremen to assign a representative for a 6-month membership on this committee.

The group of 12 men meets every Wednesday morning at 11 o'clock. Discussions are held relative to possible safety hazards and recommendations are made for improved practices. The committee members also receive instructions in approved safety practices. The 55-minute meetings are scheduled on company time.

Company Supervisors Profit from Power Show

The management of Jenkins Bros., valve manufacturers in Bridgeport, Connecticut, sent over 90 of their supervisors for a one-day visit to the recent Power Show in New York City. As explained by J. L. Dunn, Vice-President in charge of Industrial Relations, who planned the tour, "We believe that an exhibit such as the Power Show will give our supervisory staff an excellent opportunity to see the many technological advances made by industry in the past five years, some of which may be adaptable to the more efficient operation of our own plant. A world of knowledge will be gained by this educational trip of our boys."

The men boarded a special railroad car in the morning and after a luncheon in New York, made a complete tour of the exhibits at the Show. In the evening a dinner was held at the Murray Hill Hotel and the men returned to Bridgeport around midnight.

The value of the trip to the men, and to the company, is attested by some of the ideas picked up by the visitors during the tour. The following are typical of the comments made by the men.

Frank Meehan commented, "The small hand lift trucks would be of value to us in our shipping department for handling valve cases and crates. There was also a gasoline or electric lift truck with a derrick attachment which could be used to great advantage for heavy machinery and placing heavy parts on machinery in the iron division.

"Of note, too, was the canvas belt used on an Ozalid machine made up in tandem arrangements rather than in one large belt, as on our Ozalid machine which is a source of trouble to us. A number of electrical switches shown by Allen Bradley Co. could be used for lessening the trouble on our electric furnace control boards. Suitable possibly for our assembly department was a hydraulic vise which works by a foot valve and leaves both hands free."

Edward Fitz said, "Among the many items of interest in labor-saving devices was a pneumatic power hack saw which is light and portable, for use where the work is too bulky to bring to a metal cutting band saw. There was an exceptional selection of labor-saving materials handling equipment."

Edward Lynch had the following to say, "One of the most impressive ideas presented at the Power Show was the trend in design of the various valves on display, to eliminate sharp corners on pipe ends, hub ends and seats. The magnitude of the displays of industrial equipment for handling products and transporting them from one department to another, was most impressive."

John Bayuk, Plant Engineer, made the following comments, "I did not run across any product or service that was entirely new, in that I receive all introductory literature and trade journals in which new ideas are set forth or advertised. On the other hand, seeing the actual products on display and in operation, and having questions answered was very worthwhile and extremely educational.

"For instance, we are now making a study of our hi-pressure pump system and the Aldrich-Groff variable stroke pump is a new type of pump that we have

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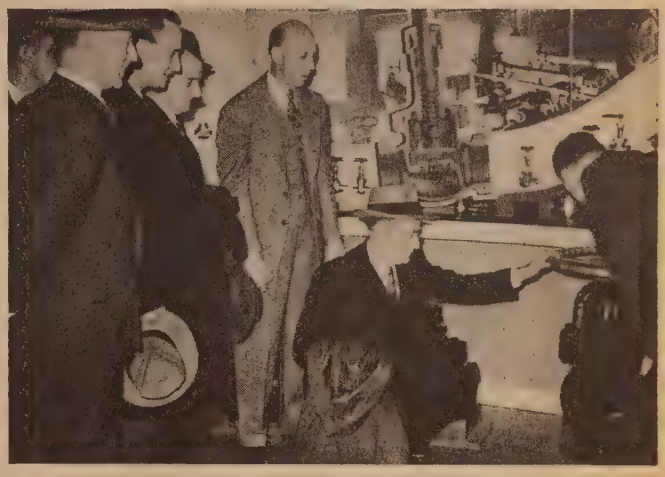
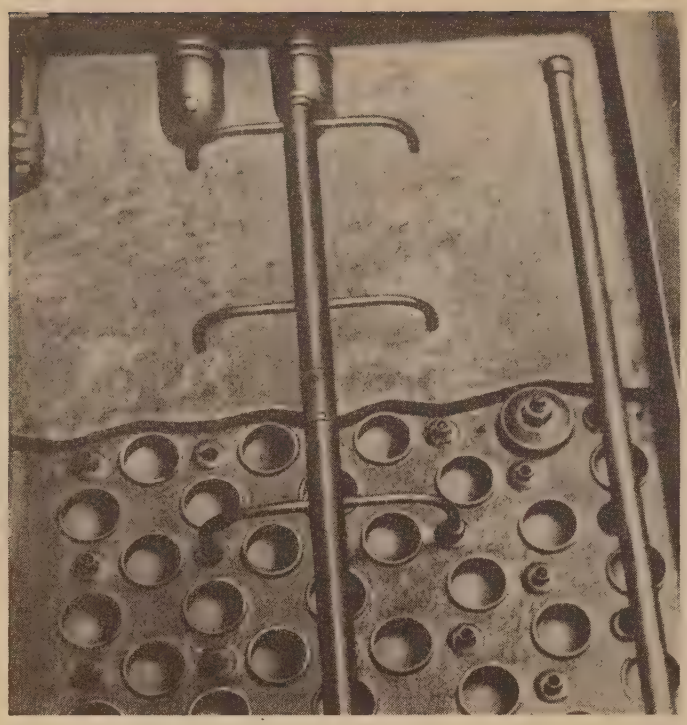


Group of Jenkins Bros. supervisors looking over the Jenkins' display. In the grey suit is H. J. Barnsley, Vice-President in Charge of Manufacturing at the Bridgeport plant.

Group of supervisors at Power Show listening to 'the voice of Pen-Flex'.

Jenkins Bros. supervisors looking over a power hack saw at the Simonds Saw exhibit.



Typical boiler header with safety hand-hole covers spaced on 4½" centers, showing method of applying mineral wool cement to thickness of 2" to fill recesses.

Insulating Boiler Headers

MANY plant superintendents who are most painstaking in the insulation of steam lines, fittings, boiler drums, and other hot surfaces, either neglect or avoid one very important source of steam boiler heat loss for lack of understanding of how to treat it—the boiler header. Boiler headers of the type studded with safety hand-hole covers present extremely irregular surfaces which at first glance seem difficult to insulate. Further, it is erroneously often thought that maintenance crews cannot get at hand-hole covers quickly and easily if they are covered by insulation.

Neither factor, however, need preclude simple and effective protection from heat loss.

A mineral wool cement can be applied so as to fill the recesses of each hand-hole cover, can be smoothed freely over the flange projection of each hand-hole cap, and can be built up to whatever thickness is most economical. When it becomes necessary to knock out any one or group of covers, it is a simple matter to break away the insulation in the vicinity, save it, and reapply the same cement after the cap is replaced. Since the mineral wool cements are not chemically or physically changed in any way by wetting, trowel application and drying, they may be reused many times.

The extreme importance of insulating boiler heads with numerous hand-hole covers becomes apparent when it is realized that the true radiation area of such a header is generally between two and three times the apparent area. The average safety-holecap is 3" in diameter by 2" deep. Holecaps are spaced only 1½" apart. One calculation on a moderate size boiler header with a nominal area of 12 sq ft, revealed a true radiation surface of 30 sq ft.

As an example, consider a boiler with an average header temperature of 400°F, which, accordingly, would have an uninsulated radiation loss of approximately 1000 BTU/hr/sq ft. When insulated with 2" of mineral wool cement, this heat loss, would be reduced to approximately 80 BTU/hr/sq ft—a heat conservation of some 920 BTU/hr/sq ft. Over the 30 sq ft true radiation surface of the above-considered 3 ft by 4 ft header, total heat conservation would be 27,600 BTU/hr. Considering coal at $5.00 per ton, the approximate annual savings effected by the insulation would be:

$$\frac{27{,}600 \text{ BTU} \times 8.760 \text{ hrs} \times \$5}{13{,}000 \text{ BTU/lb} \times 2000 \text{ lb} \times 60\%} = \$71.09$$

This $71 is equivalent to over 14 tons of coal.

Since the cost of the insulation of such a boiler head would never exceed $40, it is obvious that the insulation would pay for itself within seven months of operation.

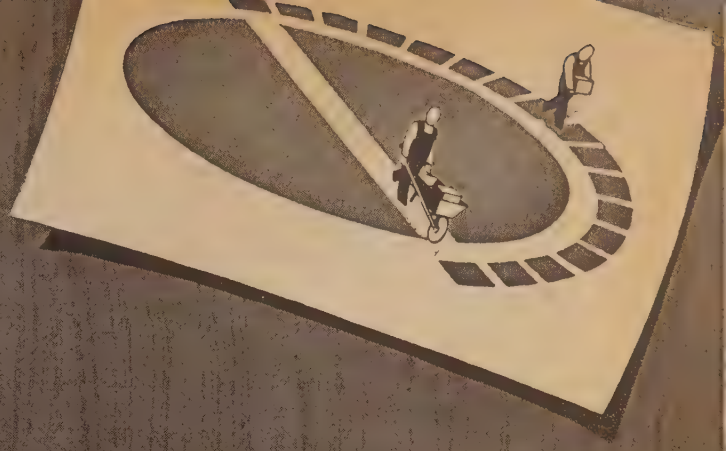
Application

The application problem, so difficult and discouraging with other forms of insulation, is extremely simple. The cement is simply mixed with water (12 gals to each 50-lb bag)—to the degree that a small amount of liquid can ooze through the fingers when a quantity of the paste is clutched in the hand. Application is by simply spotting (throwing on by hand) a sufficient quantity to trowel to a thickness of ¾" to 1". After the first coat is dry, the process is repeated until the desired thickness is achieved. Adhesion to steel will exceed 3 psi. The cement will withstand temperatures up to 1500°F with no physical or chemical change, and 100 lbs of dry cement should cover not less than 45 sq ft to a thickness of 1".

Because of the relatively long fibre of mineral wool insulations, it is possible to withdraw patches of the cement for boiler maintenance and inspection at any point. After the hand-hole covers are replaced, it is merely necessary to crumble up and reapply the cement.

In view of the wide usage of small and medium size boilers thus studded with safety hand-hole caps (one St. Louis company reporting over three million covers already in service) the great potential fuel savings in boiler header insulation is apparent. It is believed by the Industrial Mineral Wool Institute, which supplied the above data, that greatest opportunity for taking advantage of the technique described will be found in breweries, cotton oil mills, dairies and creameries, institutions, green houses, hospitals, hotels, ice plants, laundries, steam driven vessels, oil refineries, packing plants, paper mills, public utilities, schools and such, where small and medium size steam generation units are common but not favored with too much advanced steam plant practice.

PRACTICAL Short Cuts and Kinks



Production-speeding ideas and methods, and workable suggestions that save time, toil, materials, and money — Contributed by employes, companies, and government agencies.

HAND CREAM BAR

Materials which are skin irritants are best handled in such a way as to prevent their contact with the skin of employes using them. In some cases, however, this is not practical, and a hand cream of suitable characteristics will aid in the prevention of skin irritation. The regular and proper use of protective hand cream has always been a problem in most industries.

In one section of the East Pittsburgh Works of Westinghouse the use of hand cream was indicated because of the nature of the work. It was formerly supplied in small jars to the female employes. Recently, it was decided to develop a more efficient method of dispensing the cream and to present it in a manner with more "sales appeal."

With those thoughts in mind safety inspectors and the maintenance department developed the "Hand Cream Bar" shown in the illustration.

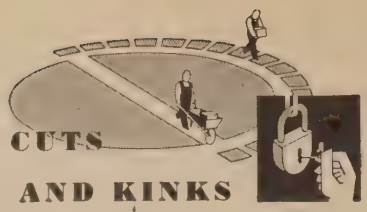
The dispenser units are converted automobile grease guns which were purchased for this job. They have proved satisfactory for dispensing the thick cream that had been found most effective for this application. The paper towel dispenser is a standard type. The containers below the dispensers are to catch any drippings. These are standard paper dishes. The waste basket is designed as a part of the board.

Complete directions for use of the hand cream are printed on the face of the towel dispenser. Since hands should be washed before applying the cream, the Bar is located immediately outside the washroom.

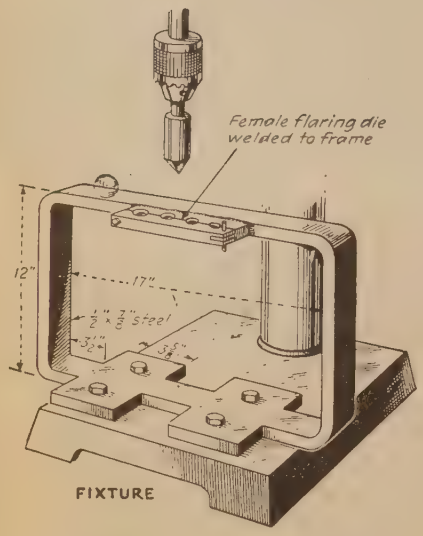
A special frame, in which cartons are placed by the safety department, serves as an additional drawing card to get the girls up to the Hand Cream Bar.

A. M. Griffith, T & G Division, Westinghouse Electric Corporation, contributed this item.

PRACTICAL SHORT CUTS AND KINKS



TUBE-FLARING FIXTURE SAVES COST OF EXPENSIVE MACHINES



The need for expensive machines has been reduced at Consolidated Vultee Aircraft Corporation, Downey, Calif., by means of the simple tube-flaring fixture shown in the accompanying illustration. The purpose of the fixture is to enable a drill press to serve in place of a regular flaring machine for many small jobs.

It is simply a rectangular steel frame which has been cut so that it can be bolted to the press base. A male die in the drill press chuck governs the angle of flare, and a female die attached to the upper part of the frame clamps the tubing so as to regulate the depth of flare.

This helpful hint was submitted by Thomas A. Dickinson, Los Angeles, Calif.

METAL TABS PRODUCE MORE PERFECT WELDS

The addition of a small piece of metal to serve as a tab on welded seams at the Ryan Aeronautical Company has resulted in more perfect welds.

In order to obtain large cylindrical sections of stainless steel, the flat sheets are formed and welded by the metallic arc method. Usually this welding produces a defect, in the form of a notch, at the beginning and end of the weld seam.

The heat from the welding process is conducted away from the weld zone by the surrounding metal. As the arc approaches the edge of the part there is an increase in temperature which occurs because of the decrease in area of heat-conducting metal. This temperature rise causes a small amount of metal to melt out and leave a notch at the seam edge. When the part is bent it will usually split at this point.

H. A. Faris, solved this troublesome problem by adding a small metal tab at each end of the proposed weld seam. The tab may be tack-welded on. Then the heat is evenly distributed for the whole length of the weld and the notch occurs at the edge of the tab where its appearance is of no consequence. The tables are trimmed off with a saw or nibbler to complete the operation.

MOBILE CONVEYOR SPEEDS SPRAY PAINTING

Production painting of aircraft parts and assemblies is performed in definite locations where waterfall spray booths and other special facilities are provided. In experimental and development work, however, it is often necessary to spray-paint individual parts in scattered locations. When the work may be situated throughout a 43-acre plant, as is the case at the Ryan Aeronautical Company, some flexible means for accomplishing it is desirable.

The Ryan Aeronautical Company has devised a mobile metal conveyor to which is attached the spray gun, with suitable lengths of air hose, and the air regulator and filter for delivering properly conditioned air. This conveyor is constructed on rollers so that it can be quickly moved to any part of the Ryan plant. The regulator is connected to an air supply outlet, available throughout the factory, and the system is adjusted to deliver any pressure of filtered air that is desired for the particular spray painting operation.

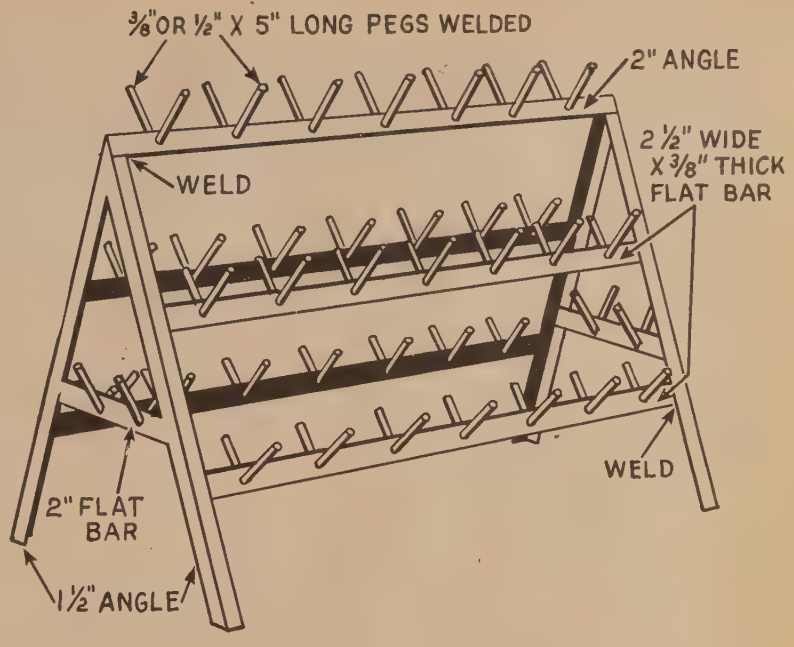
With this apparatus, increased use and flexibility have been added to the spray gun equipment.

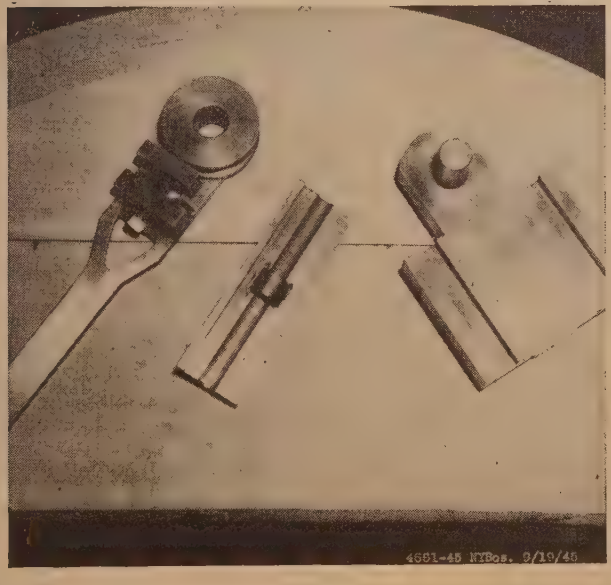
HANDY RACK FOR GASKETS AND PIPE HANGERS

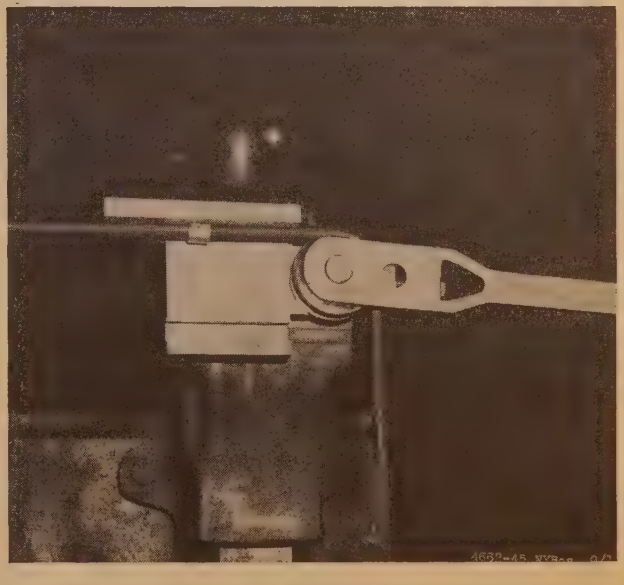
Here is a handy rack for gaskets, pipe hangers, flanges or assembly parts. The rack can be made for any height up to six feet, or it can be made in a miniature size for a bench.

On the flat bars ⅜" or ½" x 5" pegs should be welded on either side of the bar to give more storage space. In fact pegs could also be welded on the angles for additional facilities, if desired.

William H. Mullen, of Quincy, Mass., submitted this idea.







RIGHT- AND LEFT-HAND BENDING MACHINE

A hand operated, pipe bending device, which was developed by John J. Doucette, an employe at the Boston Shipyard, makes possible bending of pipe up to and including ½ inch in size to any desired angle.

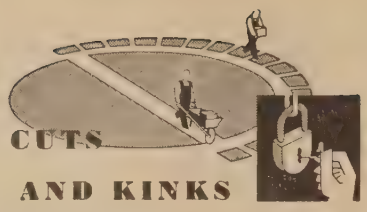
The principles applied to this device are well known. However, a true radius is obtained and a substantial amount of time saved by its use.

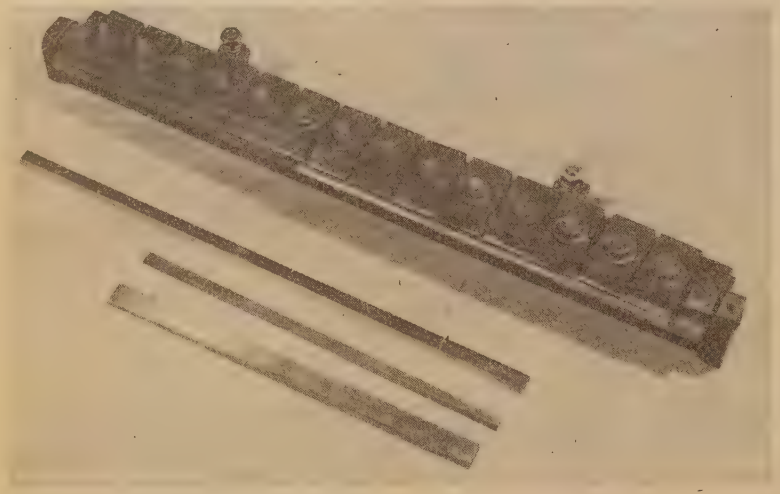
The device consists of a bending wheel, which is grooved to conform approximately to the curvature of the pipe, attached to a hand lever. The bending wheel is placed on the pin projecting from the base. Two T-slots receive a sliding member which is used to secure the pipe to be bent. The feature of the device is its capacity for making right or left hand bends, determined by the slot used for the sliding member.

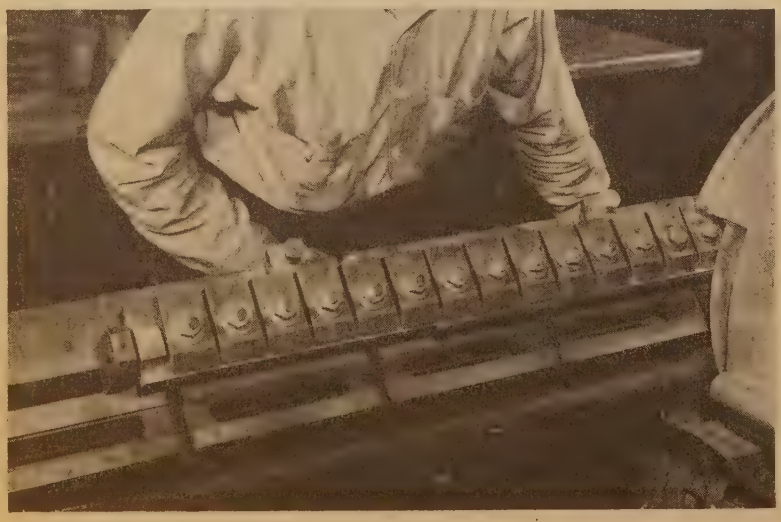
Results: Former methods for bending pipe, which were not altogether satisfactory, required the skill of a craftsman; whereas, the use of this simple device permits an unskilled operator to perform the operation faster and more accurately.

The originating activity reports an estimated annual saving of $400 by the adoption of this suggestion which was submitted under the Navy Employes' Suggestion Program.

PRACTICAL SHORT CUTS AND KINKS







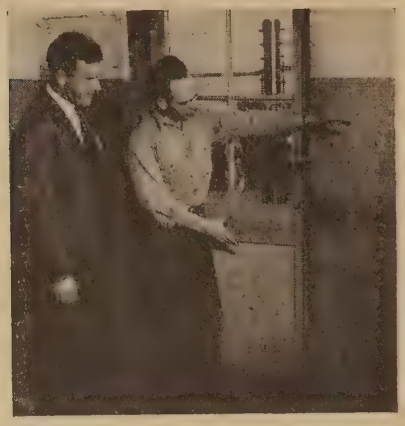
SAFE, TRUE GRINDING OF PLANER AND JOINER KNIVES

A floating jig for grinding high speed carbon planer and jointer knives has been devised. It assures safe, true grinding and prevents burning knives when dry grinding.

The jig consists of holding clamps, adjusting springs for floating bed, floating bed, center pin, stud to lock to grinding bed and the grinder bed itself, located as indicated on the accompanying illustration.

This idea comes from Ben Koplinski of the Allis-Chalmers Mfg. Co., Milwaukee, Wis., and the jig is being used with good results.

BOTTLENECK BUSTING IDEA WINS DOLLARS FOR SUGGESTER

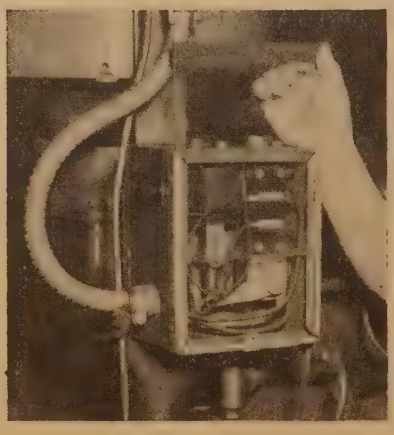


To eliminate a bottleneck at quitting time, Milton T. Holcomb, employe of the Bridgeport Electric Shaver Division, Remington Rand, Inc., suggested that the door be enlarged.

Here he is showing Supervisor Blute how much wider to make the exit in order to avoid congestion. Submitting this idea to the company's Employe Suggestion Plan, Holcomb won $25 as an award for the safety suggestion.

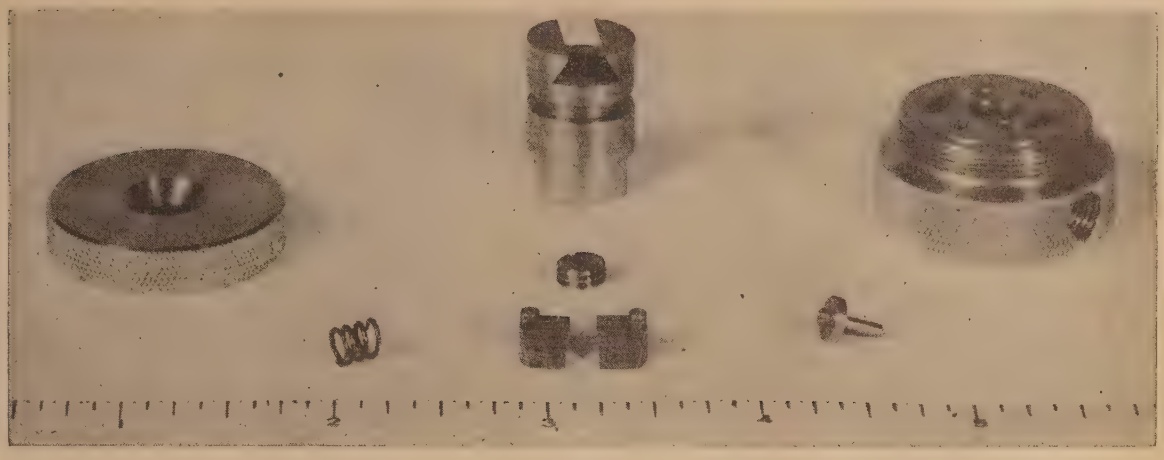
★

GLASS COVER MAKES INSPECTION EASIER



Glass is lots easier to see through than metal. So Ed McLaughlin, machinist at the Dunmore Repair Shops of the Erie R. R. replaced the metal cover on a compressor, magnetic unloader enclosure, with glass.

Now it is much easier to inspect, daily, the cotter pin which frequently wears out, causing the oil to burn out.



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IMPROVED NOZZLE PERMITS FASTER SPRAYING

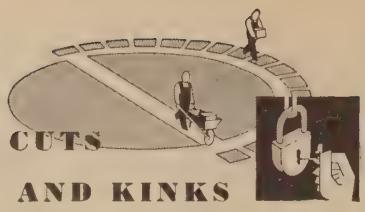
★

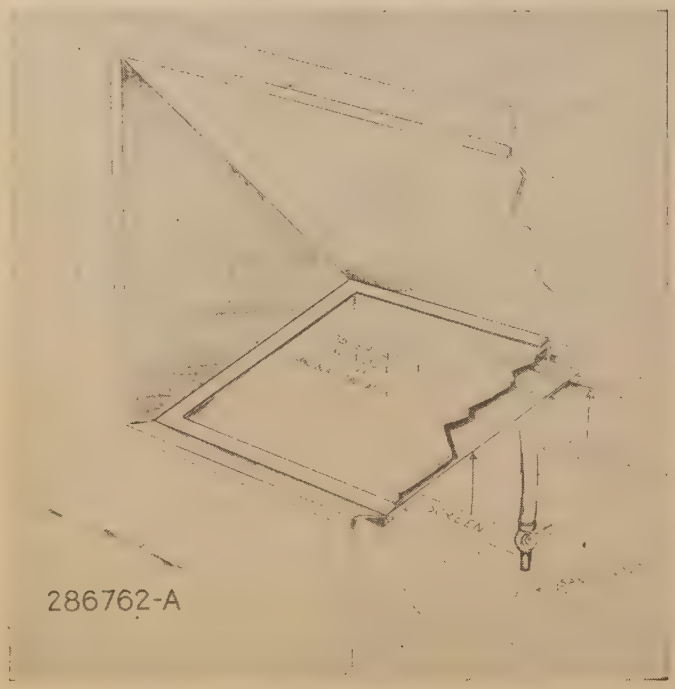
Hot plastic spraying operations have been considerably improved at the Mare Island Shipyard through the use of an improved type of nozzle or spray tip, suggested by two employes in the electric repair department—E. Earl Wilson and Richard B. Hubbard, Electricians. These new tips produce a spray of uniform density which results in an even deposit of plastic over the entire spray area. The old tip deposited a heavy coat of plastic near the center of the spray and a very thin coat near the edges.

The new nozzle is a modification of the old type but in the new, both jaws are adjustable and the actuating pins are located in the nozzle jaw, rather than in the nozzle cap. The two eccentric adjusting slots in the cap fit over the pins in the nozzle jaws, when the cap is in place. Slight rotation of the cap opens or closes the jaws and gives much better control over the spray volume. This type of nozzle can be opened as wide as the intake passage making it almost impossible to clog up. The new nozzle, the idea for which was submitted under the Navy Employe's Suggestion Program, is easy to adjust and breakage is at a minimum.

Results: The suggested nozzle improves the uniformity of the hot plastic coating and makes possible increased speed in spraying operations as the nozzle is easily adjustable. The originating activity reports estimated savings of $3,000, due principally to less breakage of tips. The old tips were often broken as they were hard to adjust and at times became clogged up and frozen.

PRACTICAL SHORT CUTS AND KINKS



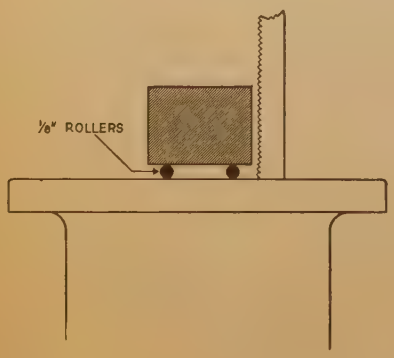


AIR PROTECTS SAND BLAST OBSERVATION WINDOW

Using a curtain of air to protect the observation window of a sand blast room from pitting, engineers at the Bloomfield, N. J., Lamp Division of Westinghouse have reduced the number of replacements as much as 90 per cent.

A ¼" pipe in which a number of holes have been drilled is mounted along the top of the window on the under side of the glass. As illustrated, the air forms a curtain across the window and deflects sand particles away from the glass.

The pipe can be installed in any sand blast equipment by following the plan shown in the sketch.



EASY CUTTING OF HEAVY STEEL BLOCKS

Merrill E. Fortin, of Waterbury, Conn., says that the placing of ⅛ inch rollers under a heavy block of steel makes it easier to push the heavy blocks against the metal band saw when cutting through them.

FASTER FINISHING OF POROUS MATERIALS

One of the most costly and time-consuming operations that can be undertaken, as a rule, is the job of getting a glossy surface finish on porous materials such as plaster, wood, and pulp products. For example, in order to finish a simple wooden chair, it is necessary to stain the wood and to apply as many as five or six coats of varnish—each of which requires about 24 hours to dry at room temperatures—before a shiny finish of the desired color becomes apparent.

At Calresin Corporation, Los Angeles, the time and costs thus required have been reduced from a matter of days and dollars to a matter of minutes and pennies by the following process: (1) Staining or pigmenting the porous article with a water color, which will dry almost as quickly as it can be applied by dip-coating; (2) Waterproofing, sealing, and glazing the pigmented article with a single coating of a transparent vinyl-base plastic which may be applied by brushing, spraying, or dipping and which will dry in about 20 minutes.

If the product should require an unusually high gloss or extraordinary resistance to water and other solutions, a second transparent plastic coating may be applied—in which case the total finishing time amounts to about an hour and costs about 5 cents per square foot.

Thomas A. Dickinson, of Los Angeles, sent in this time-and-money saving tip.

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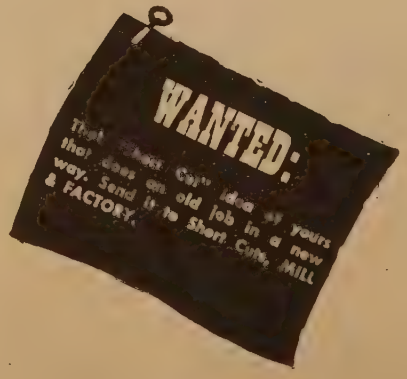
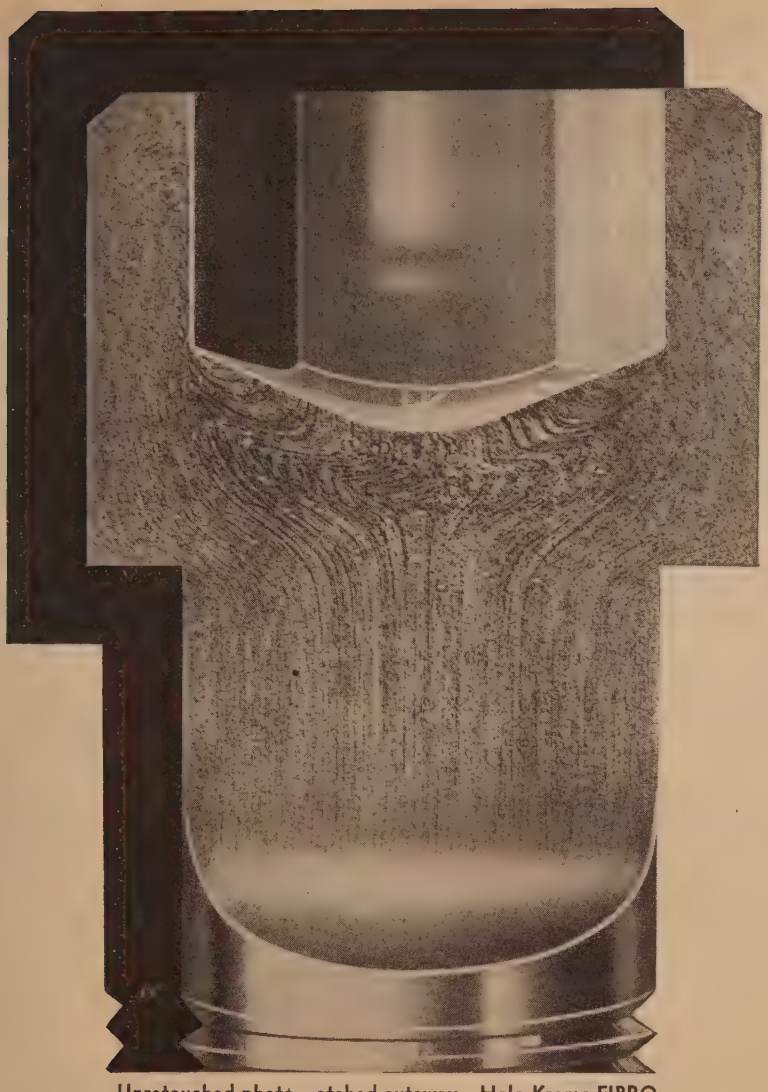




Unretouched photo—etched cutaway—Holo-Krome FIBRO FORGED Socket Head Cap Screw.

NOTICE THOSE CONTINUOUS FIBRES . . .

the results of

COMPLETELY

COLD FORGING

Patented Method Owned Controlled Exclusively used by Holo-Krome

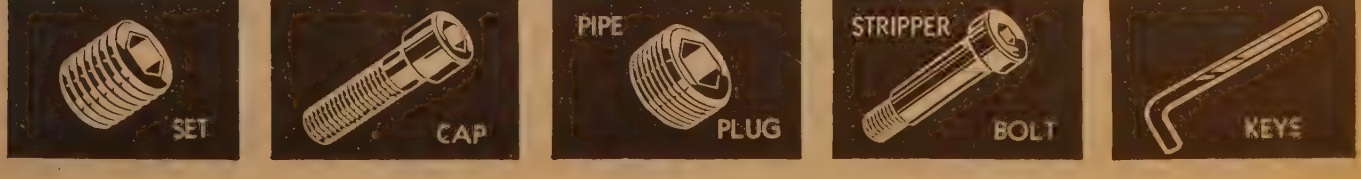
HOLO-KROME

fibro forged SOCKET SCREWS

Continuous Fibres running from end to end! Uninterrupted, unbroken, unsevered! A stronger Socket Screw. This continuous fibrous structure is obtained by Completely Cold Forging—a Holo-Krome patented method.

Yes, when you specify "Holo-Krome FIBRO FORGED Screws", greater strength, uniform quality and accuracy are assured plus the saving of weight, space and assembly time in your production.

THE HOLO-KROME SCREW CORP., HARTFORD 10, CONN., U. S. A.



BUSS FUSETRONS

will provide

BURNOUT PROTECTION

for COILS–SOLENOIDS–TRANSFORMERS

Simply–Inexpensively–and eliminate costly and troublesome replacement jobs.

Here's actual proof:

Says the Electrical Engineer of a large midwest company. (Name on request.)

"We were having trouble with solenoid coils that operate remotely controlled DC circuit-breakers. For mechanical reasons the breakers sometimes failed to close and when they did the solenoid coil burned out.

"New coils cost $36.00 and in addition we had the trouble and expense of having a man manually operate the breaker 24 hours a day until the coil was replaced.

"We tried small circuit-breakers to protect the coils but they failed. A size small enough to protect did not have enough time-lag to let the coil operate.

"Then we installed 4 ampere 600 volt Fusetrons. They completely solved our problem. The solenoid coils no longer burn out."

BUSS

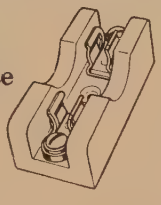
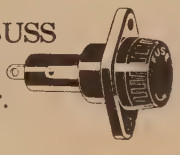
Eliminate Shutdowns—Keep Things Running

The solution is simple with Fusetrons

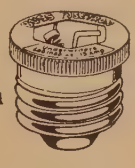
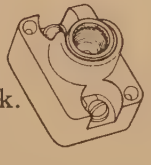
To safeguard Coils, Solenoids, Transformers, etc., the protective device must have a time-lag long enough to hold normal starting currents or harmless overloads. Yet it must open to protect, should something go wrong.

Fusetrons because they combine a fuse with a thermal cutout can give this kind of protection and prevent burnout of such apparatus.

HERE'S ALL YOU NEED TO PROTECT COILS, SOLENOIDS AND TRANSFORMERS.

A Fusetron of proper size, plus a fuse block—  or a BUSS fuse-holder. 

On voltages up to 125, the same accurate, dependable protection can be provided with

a proper size plug Fusetron  or a Fustat, plus a fuse block. 

Why risk a costly and troublesome repair or replacement job—and take a chance crippling plant or building operations, when Fusetron protection is so simple and inexpensive?

What is the FUSETRON?

The Fusetron is a Dual Element device—a Fuse to which is added a Thermal cutout.

The result is a fuse with tremendous time-lag and much less electrical resistance.

Fusetrons have the same degree of Underwriters' Laboratories approval for both motor-running and circuit protection as the most expensive devices made.

Made to the same dimension as ordinary fuses, Fusetrons fit all standard fuse holders.

Obtainable in all sizes from 1/10 to 600 ampere in both 250 and 600 volt types. Also in temper-resisting type (Fustats) for 125 volt circuits.

Their cost is surprisingly low.

Fusetrons Give Many Other Kinds of Protection Heretofore Not Available

Fusetrons do everything fuses do, as is confirmed by the Underwriters' Laboratories Label, and in addition . . .

★ Provide simplest way to stop burnouts from single phasing. ★ Entirely wipe out needless blows caused by motor starting currents or other harmless overloads. ★ Give thermal protection to panelboards and switches. ★ Prevent needless blows caused by heating in panels and switches. ★ Permit use of larger motor or adding more motors on circuit without installing larger switch or panel. ★ On new installations, proper size switches and panels can be used instead of oversize. ★ Protect motors against burnout. ★ Give double burnout protection to large motors. ★ Make burnout protection of SMALL motors simple and inexpensive.

Get All the Facts

Get Better Protection • Send the Coupon Now

Don't risk avoidable losses. One burned out solenoid—or one needless shutdown—or one destroyed panel may cost you more than replacing every fuse with a Fusetron.

You simply protect your pocketbook by installing Fusetrons throughout the entire electrical system.

BUSSMANN MANUFACTURING COMPANY
University at Jefferson • St. Louis 7, Mo.
(*Division McGraw Electric Co.*)

FUSETRONS

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Bussmann Mfg. Co., University at Jefferson
St. Louis 7, Mo. (Division McGraw Electric Co.)

Please send me complete facts about BUSS Fusetrons.

Name_____

Title_____

Company_____

Address_____

City_____ State_____

• A Rubber Blotter Weighing 187 Pounds

Sometimes referred to as a huge rubber blotter, this electric heating pad for drying multi-colored inks in the fabric printing industry weighs 187 lbs and is 30 ft long. Developed by Goodyear Tire & Rubber Co., Akron, Ohio, the pad is said to be the largest rubber heating unit ever made for commercial use. It is fashioned "sandwich" style with specially compounded electricity conducting rubber between non-conductive sheets. Heat output is eight kilowatts, controlled by a thermostat and accomplished without use of resistant wires or metallic elements. It is waterproof and highly flexible.

• Western Metal Congress

More than 40,000 metals scientists, engineers and executives are expected to attend the 5th Western Metal Congress and Exposition which will be held in the two Oakland Civic Auditoriums in the San Francisco - Oakland - Golden Gate area for six days beginning March 22.

W. H. Eisenman, managing director of the Exposition and also national secretary of the American Society for Metals said:

"Current interest in the progress made in metal alloys, metals manufacturing and fabricating equipment and other phases of the metals industries is at a high point. Never before have we seen such a manifestation of interest in the field. Attendance at the recently held National Metals Congress and Exposition at Atlantic City showed without question that general interest in achievements of the field is at an all time high."

It was pointed out that further evidence of interest is the fact that more manufacturers of metals industries products are showing in 1947 than ever before in a Western Metal Show. The technical programs already completed show more than 75 technical papers, lecture courses and round table discussions, also a new high for this event.

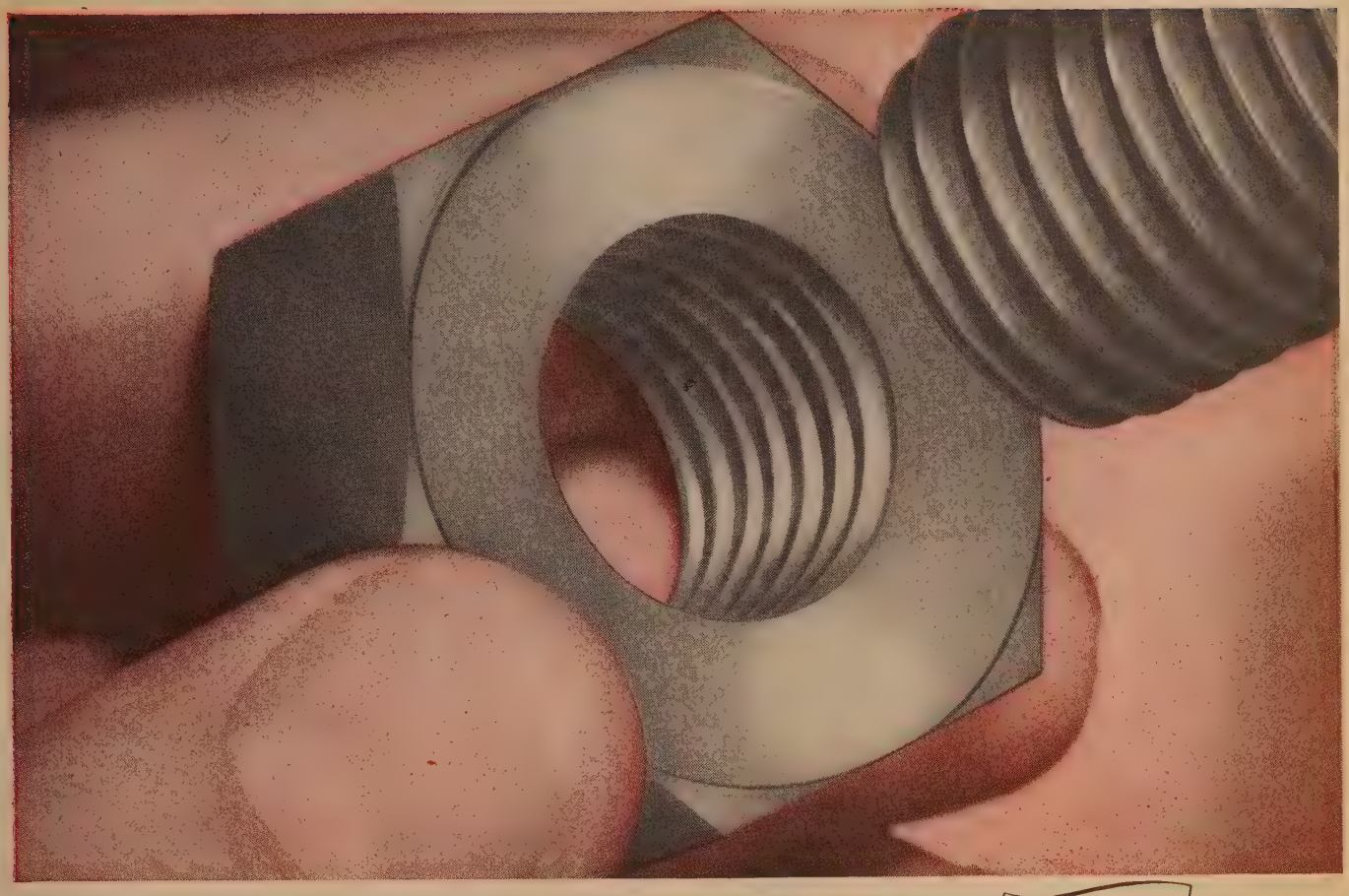
Sixteen western divisions of technical societies are actively co-operating in program and other activities of the Western Metal Congress and Exposition. The list includes the American Society for Metals, sponsors of the event; American Chemical Society; American Foundrymen's Association, American Industrial Radium and X-Ray Society, American Institute of Mining and Metallurgical Engineers, American Institute of Electrical Engineers, American Society for Testing Materials, American Society of Tool Engineers, Inc., American Welding Society, the Mining Association of California, Northwest Electric Light and Power Associations, Pacific Coast Electric Association, Purchasing Agents Association of California, Inc., Society of Automotive Engineers, Western Oil and Gas Association, and American Petroleum Institute.

All technical sessions and other educational activities of the cooperating societies will be held in the Oakland Civic Auditoriums, the Auditorium Arena and the Auditorium Exhibit Hall, same buildings where the Exposition will take place.

Speakers

Among speakers who will address the Congress are A. L. Boegehold, president of ASM and head of the metals department of the General Motors Research Laboratory, Detroit, Mich.; E. E. Thum, editor of Metal Progress, journal of the American Society of Metals, Cleve-

• Continued on page 230



WHEN YOU LOWER THE COST OF USING FASTENERS . . . THAT'S **t.f.e.** True Fastener Economy!

Since the time and labor costs of assembling a nut on a bolt usually exceed the cost of the fasteners, it's *T*rue *F*astener *E*conomy to buy the brand that gives maximum speed and convenience in assembly.

RB & W Nuts Save Assembly Time

The care which RB & W takes to produce nuts with utmost accuracy and uniformity . . . pays off in terms of lower assembly cost. Careful selection of material; cold-punching that insures toughness, freedom from splitting, uniformity of size; repunching that guarantees concentricity of hole; burnishing that assures smoothness of all surfaces; tapping on machines of special design that provide accurate, clean threads . . . result in nuts that run on quickly and take severe wrenching in their stride.

You Get T. F. E. When You

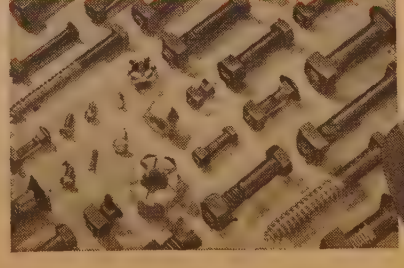
1. Reduce assembly time to a minimum by savings through use of accurate and uniform fasteners
2. Make your men happier by giving them fasteners that make their work easier
3. Reduce need for thorough plant inspection, due to confidence in supplier's quality control
4. Reduce the number and size of fasteners by proper design
5. Purchase maximum holding power per dollar of initial cost, by specifying correct type and size of fasteners
6. Simplify inventories by standardizing on fewer types and sizes of fasteners
7. Save purchasing time by buying larger quantities from one supplier's complete line
8. Contribute to sales value of final product by using fasteners with a reputation for dependability and finish

RUSSELL, BURDSALL & WARD BOLT AND NUT COMPANY

102 years making strong the things that make America strong

RB&W bolts, nuts, screws, rivets and allied fastening products are manufactured in a broad range of styles, sizes and finishes.

Plants at: Port Chester, N. Y., Coraopolis, Pa., Rock Falls, Ill., Los Angeles, Calif. Additional sales offices at: Philadelphia, Detroit, Chicago, Chattanooga, Portland, Seattle. Distributors from coast to coast. By ordering through your distributor, you can get prompt service from his stocks for your normal needs. Also—the industry's most complete, easiest-to-use catalog.



Information available from manufacturers designed to aid the industrial executive improve production methods and get the maximum performance and life from his equipment.

1. CHEMICAL TERMS—12-page glossary of technical words, terms and phrases used in the plastic and rubber industries is valuable to manufacturers, fabricators and designers in that field. B. F. Goodrich Chemical Co.

2. CALCULATOR—Simple calculator called a Dilut-O-Graph makes it possible to compute quantities in a matter of seconds, when mixing or diluting oils. Given the recommended mixing proportions and capacity of the tank, the calculator shows precisely how much base oil to use. Is circular, of special composition board, and is 4½" in diameter. D. A. Stuart Oil Co.

3. ELECTRONIC TUBE DATA—Booklet #86-020, "Easy Guide to Electronic Tube Data", lists tubes according to family or class—phototubes, pliotrons, ignitrons, etc.—and gives all essential technical data on each tube. Interchangeability chart shows company's equivalent for competitive type numbers. Explains functions of electronic tubes. Westinghouse Electric Corp.

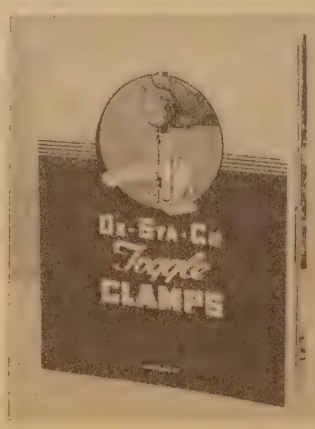
4. SYNTHETIC RUBBER—Excellent 50-page booklet, "Five Years of Synthetic Rubber", shows, in simple language, the dramatic growth of the synthetic rubber industry and gives appraisal of its importance in manufacture of rubber products. Various types of synthetic rubber and analysis of properties given. Technical appendix gives useful glossary of terms. U. S. Rubber Co.

5. OILS FOR INDUSTRY—Industrial users of petroleum products should find bulletin #A-1430 a quick and ready reference of uses and characteristics of company's line of industrial oils, greases, metalworking oils, processing oils, and miscellaneous industrial products. Sun Oil Co.

6. BUSHINGS, BEARINGS—Catalog #45 has 17 pages on bushings, bearings, bar stock and babbitts. Has table of bushing sizes, machining data and decimal equivalents in addition to other data on the specific subjects. Shook Bronze Corp.

7. PLATFORM SKIDS—"Mr. Bee Knows The Answer" is title of bulletin on platform skids available in wide range of sizes, built of aged lumber and bound with heavy gage, electrically welded and bolted steel. A roller conveyor for pieces wider or smaller than maximum width conveyors is also shown as are hand trucks. Bearing and Transmission Co.

8. TOGGLE CLAMPS—Machinists, tool and production engineers and others whose problems include holding of parts in production should be interested in 32-page



1947 catalog #47 on toggle clamps. Has detailed specifications of the entire clamp line and illustrations of many applications. One section has data on arbor spacers, shims, shim and feeler stock, and miscellaneous job stamps. Detroit Stamping Co.

9. TRADE-MARK LAW—"Preparing for the New Trade-Mark Law" is 56-page analysis which compares the new Law with the Lanham Act, which will be effective July, 1947, with the present trade-mark law. Analysis tells you where you stand, what to expect, and what to do, and what changes will be brought about. Research Institute of America.

10. UNIT HEATERS—Catalog #CUH-846-A concerns unit heaters made of high test cast iron made for permanency. Have one piece construction heating sections tested to withstand steam pressures up to 250 lbs. Cast in one piece with no soldered, brazed, or similar connections to develop leaks. No electrolysis to cause corrosion—therefore, said to be free from maintenance expense. D. J. Murray Manufacturing Co.

11. INDUSTRIAL CONTROLS—Bulletin #200 gives general information, price sheets, dimension drawings, guarantee and discount terms on industrial controls. Master Electric Co.

12. HYDRAULIC LIFTING—Prominent uses for company's hydraulic lifting units are pictured and described in catalog #600. Hydraulic loading platforms and elevators, freight elevators, sidewalk elevator and loading platform, etc., are shown. Joyce-Gridland Co.

13. WASHING EQUIPMENT—Sanitary washing equipment described in catalog #23 includes fountains for group washing. Economy sprayhead is said to save up to 60% water consumption over basin-type fixtures and to eliminate use of gaskets, washers or packing. Has self-cleaning feature. Sanitary drain feature is standard equipment. Metalloid Engineering and Mfg.

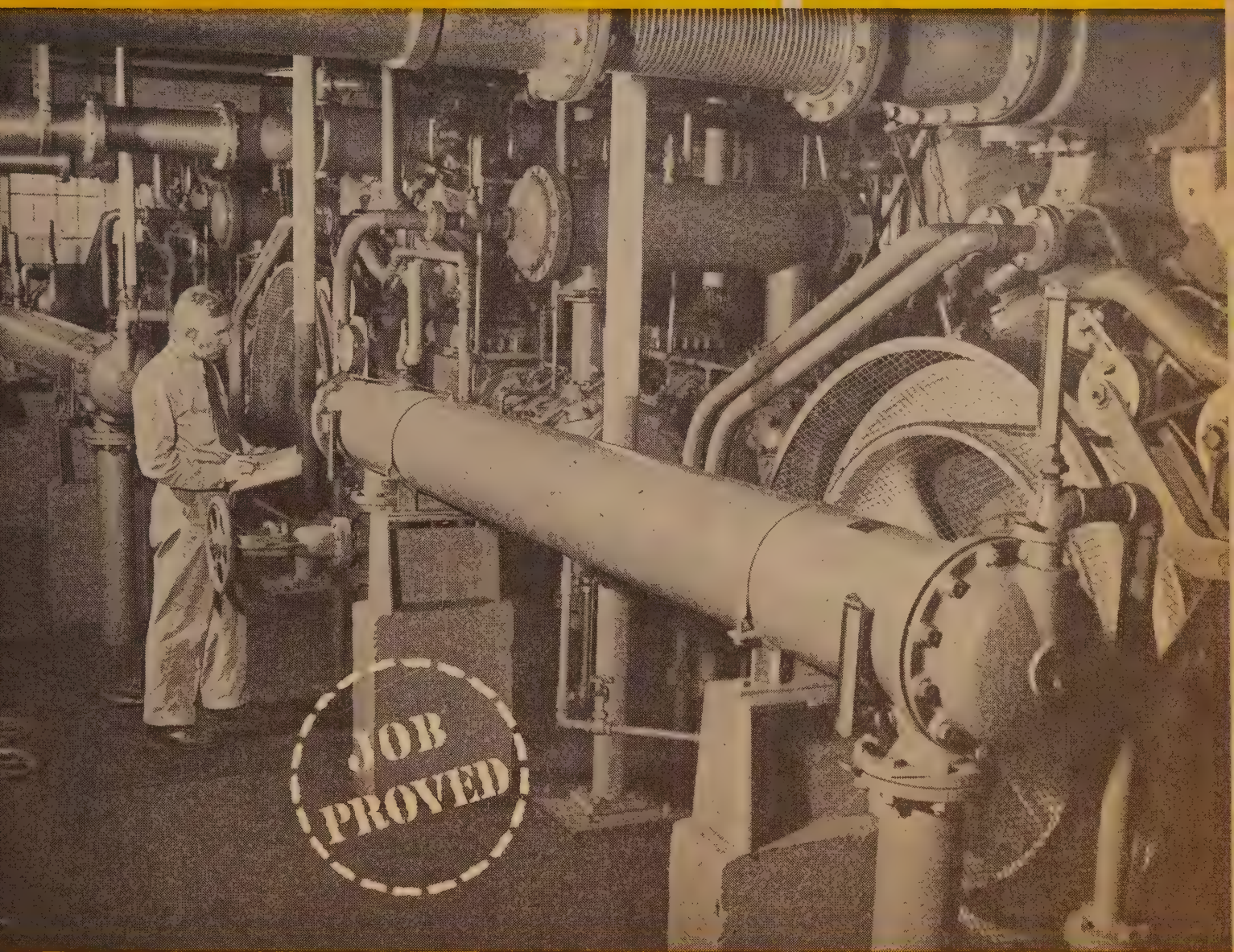
14. RETAINING RINGS—20-page catalog #4K/14 presents retaining rings which are new approach to locking, securing and positioning of machine parts such as gears, bushings and bearings, on shafts and in housings. Can be applied where previously only fasteners such as nuts, bolts, cotter pins, etc., where used. Said to eliminate disadvantage of oval deformation at time of assembly and disassembly. Waldes Kohinoor, Inc.

15. GAGES—Condensed 18-page catalog A concerns indicating gages, dial indicators, dial comparators, fixed limit gages, and adjustable limit gages. Is well illustrated and gives all essential data for each model. Standard Gage Co., Inc.

16. DRILLS & BUFFERS—48-page catalog #29, 5th edition, gives illustrations, descriptive text and specifications for the following: electrical drills, screw drivers, nut setters, tappers, routers, aerial grinders, tool post grinders, speed lathes, bench and pedestal buffers, bench and pedestal grinders, abrasive cut-off machines, and dust collectors. Cincinnati Electrical Tool Co.

• Continued on page 166

Compressing Maintenance Problems



SUN COMPRESSOR LUBRICANT...

Keeps Compressors Operating Four Years on 24-Hour-a-Day Schedule

Twenty thousand and ten hours of trouble-free operation were piled up by one unit in a big, industrial plant operating a battery of heavy-duty 400 horsepower compressors. There was no time out except for routine inspections. Sun Oil was used from the very first hour these compressors were installed. When they were finally shut down for major overhauls, no wear was apparent and no major parts had to be replaced.

Sun "Job Proved" industrial lubricants are making similar impressive records in all kinds of industrial plants, keeping production on an even, round-the-clock basis, holding down maintenance and operating costs. If you have problems concerning the lubrication of compressors, power plants, machine tools or other industrial equipment — remember the Sun Engineer is at your service without obligation on your part. Just phone the nearest Sun office or write Dept. MF-2 . . .

SUN OIL COMPANY · ***Philadelphia 3, Pa.***
Sponsors of the Sunoco News-Voice of the Air — Lowell Thomas

SUN
SUNOCO
INDUSTRIAL
PRODUCTS

• Continued from page 164

17. PHOTOGRAPHIC MATERIALS — 44-page booklet, "Kodak Recording Materials", describes photographic recording materials for use with cathode ray tube oscillographs, galvanometer oscillographs, and similar instruments. Has information on physical and photographic properties of films and papers, on processing procedures, equipment and materials. Equipment and technique for cathode ray tube photography discussed. Industrial Photographic Sales Div., Eastman Kodak Co.

18. WASHFOUNTAINS—Bulletin," New Washfountains", pictures and describes various types of enameled iron and stainless steel fountains for group-washing requirements. Come in 54" and 36" diameter sizes, circular and semi-circular, hand or foot-controlled, and in types to meet every plumbing condition. Bradley Washfountain.

19. FLAME CUTTING— Illustrated bulletin, "Flame Cutting", describes facilities for producing plain and intricate shapes from steel plates. Typical flame cut sections are shown and information given on use of irregular shaped steel plates in production and maintenance work. Joseph T. Ryerson & Son.

20. WELDING & CUTTING—New 64-page general welding and cutting products catalog has 2 sections: one for oxyacetylene welding and cutting gases, equipment and supplies; the other for arc welding machines, accessories and electrodes. Ten pages concern specially compiled electrode price lists. Air Reduction Sales Co.

21. DILATOMETER—Comprehensive data sheet #EC-21 and 6-page reprint, "A New Type of Recording Dilatometer", give facts and trace development of this prototype instrument. Calibration of the instrument is described and given in typical elongation vs temperature curves for alloys and glass, and curves showing thermal critical points. Sylvania Electric Products.

22. SYNTHETIC RUBBER— Informative 8-page catalog, "Neoprene", tells of the many uses of this synthetic rubber claimed to be more versatile than other synthetic rubbers; to be formulated in hard or soft compounds; to have good resistance to abrasion and wear. Many other characteristics of these compounds are pointed out. By proper choice of compounding ingredients, it is possible to vary within limits their major properties such as hardness, modulus, elasticity, tensile strength, ultimate elongation, permanent set, tear strength, etc., it is said. E. I. du Pont de Nemours & Co.

23. WELDING TECHNIQUES—Revised and well illustrated edition on welding techniques, bulletin #W-2A, features welding of aluminum bronze electrodes by carbon and metallic arc methods. Has comprehensive weldability chart for copper-base alloys. Ampco Metal.

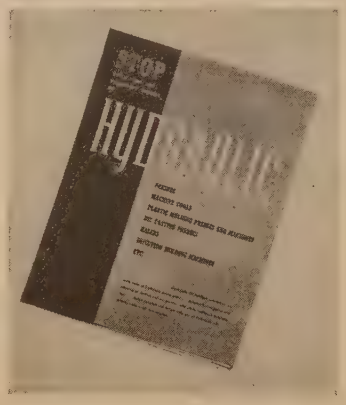
24. INDUCTION HEATING— Comprehensive 59-page manual, "Induction Heating", covers general history, principles and applications of induction heating and deals specifically with many of its most technical considerations. Ohio Crankshaft Co.

25. BALL BEARINGS— Handy tab-indexed ball bearing catalog #21 has 200 pages of information on bearings beginning with a guide showing use of the bearings described in catalog. Single-row, radio-thrust, duplex, double-row, lubri-seal, extra large, miscellaneous, and thrust bearings are presented along with bearing fits and

HOW TO DO IT

shoulder diameters and other miscellaneous data. Marlin-Rockwell Corp.

26. PURIFYING OILS—Bulletin tells "How to Stop Down Time and Expensive Repairs on Hydraulic Presses", machine tools, plastics molding presses and machines,



die casting presses, balers and injection molding machine by effective purification of hydraulic oils. Discusses common forms of contamination which cause hydraulic equipment to operate inefficiently and reasons for such contamination in the oil. Honan-Crane Corp.

27. HAND TOOLS— 80-page catalog #19-R presents company's complete line of forged hand tools with illustrations and descriptive text. General index lists over 250 classifications which are presented in the catalog. Plomb Tool Co.

28. COATINGS—Bulletin 244-5M, entitled "Visual Index," shows industrial applications for different types of protective coatings. Has large composite drawing of factory showing where the products can be used in prevention of corrosion. There is handy check to determine correct coating. Wailes Dove-Hermiston Corp.

29. BRACING CAR DOORS— Bulletin #AD-61 gives demonstration of safe economical way to brace car doors with steel strapping after car is loaded for shipment. Said to be easy and economical. Snipping of bands is all that is needed to unload. Acme Steel Co.

30 PACKAGED POWER— 16-page bulletin Book #2085 describes electrofluid drive which makes possible use of a motor of a size which is right for normal operating power needs of equipment. Comes as packaged unit; consists of induction motor, flange-mounted to a housing and a hydraulic coupling. Motor continues operating when unforeseen overloads or jams occur; torque applied to driven equipment is limited to capacity of the electrofluid drive, thus eliminating chance of damaging equipment. Link-Belt Co.

31. CIRCUIT BREAKERS— Bulletin #7186421 describes up-to-date line of high voltage, quick-clearing outdoor, frame-mounted circuit breakers designed to meet latest a-c power circuit breaker standards in ratings 15 to 46 kv, 500,000 to 1,500,000 kva interrupting capacity. Allis-Chalmers Mfg. Co.

32.—DRAWING SHEET METAL—Booklet #D-120 contains time and money saving ideas for anyone connected with deep drawing of sheet metal. Numerous jobs illustrated and described. Carboloy Co., Inc.

33. STEEL STANDARDS —"Specifications for the Design of Light Gage Steel Structural Members", 39-page booklet, consists of design provision governing shapes made of flat or straight elements encountered in design of structural members formed of light-gage steel. Design tables, curves and charts, and illustrative examples included. American Iron & Steel Institute.

34. TEMPERATURE RECORDER — Bulletin #GEA-4572 describes temperature recorder which consists of portable instrument and an associated power-supply unit which can be wall mounted for permanent installation. Temperature variations are recorded on strip chart. Is convenient way of correlating temperature data with other measurements in electrical and mechanical systems. General Electric Co.

35. TORQUE SWITCH— Vol. 2, #4, of "Uses Unlimited", introduces ultra-small V3-14 switch which is operated by low torque, rotary motion instead of linear actuation of a plunger. This development opens new fields of use for compact switches. Micro-Switch, Div. of First Industrial Corp.

36. TRANSMISSION EQUIPMENT — New 320-page general catalog #54 on power transmission equipment and component machine parts contains complete specifications and list prices on all stock sizes of spur, bevel, miter, helical and worm gears, chain and sprockets, reducers, couplings, ball bearings, and other equipment. Boston Gear Works, Inc.

37. RIVETING— New monthly bulletin, "The Townsend Riveter", gives case studies of riveting and allied problems. To be placed on permanent mailing list, check this item. H. P. Townsend Mfg. Co.

38. HYDRAULIC EQUIPMENT— New 24-page hydraulic equipment catalog #P-46 presents what is called the universal shop tool which creates and applies controlled hydraulic force for pushing, pulling, pressing, bending, spreading and clamping jobs. Its use with specialized attachments is shown. Consists of hydraulic pump, high-pressure hose, all-directional ram, and special attachments. Application photos and other data given. Blackhawk Mfg. Co.

39. LUBRICATION—28-page brochure, "Lubricating Greases", is written from point of view of the average user rather than of the engineer. The composition and manufacture of grease is explained and then various types of lubrication, such as for in-

• Continued on page 168

Comparison with the service life of other ropes shows that it pays to standardize on J&L Precisionbilt Wire Rope. It consistently handles loads longer with safety—helps reduce maintenance costs. Specify J&L Precisionbilt Wire Rope for all your installations and equipment.

J&L STEEL

JONES & LAUGHLIN STEEL CORPORATION

GILMORE WIRE ROPE DIVISION

PITTSBURGH 30, PENNSYLVANIA

J&L *Precisionbilt* PERMASET PRE-FORMED WIRE ROPE

• Continued from page 166

dustrial bearings, automotive and mobile equipment, etc., are discussed. Sinclair Refining Co.

40. FAIR TRADE— "The ABC's of Fair Trade" is booklet to aid sales executives in formulating price policies. New edition is designed especially to aid manufacturers who plan to protect trade-marked product through the Fair Trade Laws. American Fair Trade Council.

41. TOOL LINE— New additions to and present models of company's line of flexible shaft machines, high speed grinders, tools and accessories are illustrated and described in 16-page folder. Included are flexible shaft machines from 1/4 to 2 hp; high speed grinders from 1/18 to 1 hp; sanding drums, brushes, buffs, etc. Wyzenbeek & Staff.

42. LOCK NUTS— Informative data most generally requested on lock nuts is included in 24-page, well-illustrated manual entitled "Lock Nuts". National Screw & Mfg. Co.

43. FOR INVENTORS— Outline of methods of new division of a company formed as a marketing service for new inventions is outlined in booklet, "A 12-Point Program for Inventors". National Merchandisers.

44. HOLDER— Full-floating holder designed to meet most exact requirements and specifications in all threading operations is described in bulletin. Is hardened and ground precision tool. Claimed to eliminate many human errors and compensate for material conditions which have bearing upon cutting good screw threads. Mosley Manufacturing and Sales Co.

45. LUBRICATING EQUIPMENT — Various bulletins on industrial lubricating equipment are bound together in one folder. Heavy duty and standard series drum pumps, time clock, controlled systems, grease guns and fittings for cars, trucks, etc.—these are among phases covered in series good to have for reference. Lincoln Engineering Co.

46. MAGNESIUM— Handsome brochure #DM102 tells the story of magnesium and points out unique characteristics of this metal which is described as a third lighter than aluminum and easiest of structural metals to machine. The Dow Chemical Co.

47. PACKINGS— Attractive brochure, "Packings", is condensed catalog with specification chart concerning many of company's rod and sheet packings. Lists information essential to have when ordering packings; gives illustrations and descriptions of many types such as cross expansion, low pressure duck packing, square flax and rayon packings, etc. Quaker Rubber Corp.

48. ROLLING CAFETERIA— Mobile electric cafeteria, compact unit which serves low-cost, balanced hot meals, as well as fruits, juices and cold items, is described in bulletin #C-990. Is electrically preheated and precooled with 4-hour holdover of safe temperatures. Various models for all types of industrial needs are shown. Schwartzbaugh Mfg. Co.

49. ABRASIVES— The story of the first man-made abrasive is related in 30-page informative booklet entitled "The Romance of Carborundum". Goes into the making of grinding wheels, the uses of abrasives in industry and other fields. Carborundum Co.

HOW TO DO IT

50. THE MACHINE WORLD— "Your Life in the Machine World" by Leighton A. Wilkie is 56-page informative and illustrated booklet giving brief story of how the machine age developed with idea that when mankind better understands what is required to make the machine age, the "common man will not willingly be 'taken in' by those whose economic fallacies invade his welfare and well-being." It endeavors to give broader understanding of fundamental principles on the part of small business men and workers and the elected political leaders. The DoAll Co.

51. USE OF AIR— First of new series of case histories entitled "Foto Facts File" shows effective use of air in speeding production. Varied and interesting cases, with illustrations, presented. Bellows Senacon Co.

52. BUS DUCT SYSTEM— Just what a bus duct electrical distribution system is, how it is installed, and what features it offers to the purchaser are questions taken up in 23-page bulletin #462. BullDog Electric Products Co.

53. A-C WELDERS— Construction details, electrical specifications and application data on complete line of a-c transformer type welders are contained in booklet #B-3548. Information given on 500 and 400 ampere industrial welders for fast, steady production; 300-ampere welder for heavier than average work, and general duty welders ranging from 20 to 250 amperes. Westinghouse Electric Corp.

54. VERSATILE TOOL— Bulletin #P&P 46 concerns jack which pulls, pushes, spreads, bends, clamps, lifts, pulls pinions, bushings, plain or spoke wheels, and gears. Called "The Tool of a Thousand Uses", it answers many daily problems in plant operations. Templeton, Kenly Co.

55. FOR MANAGEMENT— Three booklets designed to make management think, are available. "Obsolescence in Men, Methods and Machines" is designed "to challenge the creative and executive abilities of those responsible in management to assay their own problems." "The Captive Shop" considers merits of continuance or non-continuance of a captive shop in the plant. "Let's Talk It Over" concerns tool and die job shops and their use in industry. Bunell Machine & Tool Co.

56. VALVES— "Pneumatic Control Valves and Controller Accessories" is 36-page bulletin #277-1. Color page shows identifying enamel finishes on valves to correspond with ASA color code. Has plates and tables of specifications for control valves, needle type valves, poppet and butterfly valves, information on computing valve sizes, and other pertinent data. Foxboro Co.

57. WIRE ROPE— Results of survey of 10 questions about preformed wire rope as answered by 8339 persons are given in 16-page pamphlet along with the questions and answers. Preformed Wire Rope Information Bureau.

58. FIRE PROTECTION— 12-page brochure, "Fire Protection for Oils and Flammable Liquids", describes projectors which use water, oldest fire extinguishing agent, in new and revolutionary ways. Surface of burning liquid is agitated into an emulsion. Grinnell Co.

59. MATERIALS HANDLING — Bulletin shows gravity conveyor spur curve and gravity conveyor hinged section and their uses in a conveyor installation. Has prices and specifications of each. Spur curve facilitates sorting and rerouting of products to a spur line in conveyor line; hinged section permits passage through line of conveyor without removal of sections. Rapids-Standard Co.

60. TYPING BY TAPE— New machine which produces letters in quantity to look individually typewritten and said to be at low cost is described in bulletin #JC-1. Is done electrically and automatically with small strip of perforated tape which is inserted in machine. Justowriter Corp.

61. MICROMETER— Folder entitled "The Dial Mike" describes micrometer said to fill need for tool that will accurately measure keyways, slots, flanges, and such places where ordinary micrometer cannot be used. Wells Mfg. Co.

62. LOCK WASHERS— Informative brochure, "How, Why and Where of Lock Washers", is good know-how on spring lock washers. Discusses "constant power zone" of the washer and its comparative merits with other fastening devices. Full specifications on all sizes of washers included. George K. Garrett Co.

63. PACKINGS— 2-page condensed catalog #PC-100 is convenient guide to company's line of mechanical packings as self-lubricating, molded, sheet, and other special purpose types. Has application chart for self-lubricating packings. Greene, Tweed & Co.

64. VALVES— New 248-page catalog, "Valves", is profusely illustrated with outside and cross sectional wash drawings of company's valve line and is designed to assist engineers, purchasing agents, produc-

• Continued on page 170

GILMER HAS THE PULL

Gilmer

MULTIPLE V-BELTS FOR POWER . . . . . FOR PERFORMANCE

Gilmer Multiple V-Belts have a grip like a friction clutch. They take tight hold as they flex around sheaves. Yet they unlock freely the instant that pressure is released . . . the Gilmer principle of straight-wall design.

Precision molding provides "matched" lengths to within very small tolerances. Pulling cords are conditioned to minimize stretch. And the tough, heavy jackets add extra months of dependable service.

Being made on the largest assortment of V-molds in the world, Gilmer V-Belts are supplied in all standard and many special sizes. When desired, belts are specially built to withstand conditions of excessive oil, heat, static, etc.

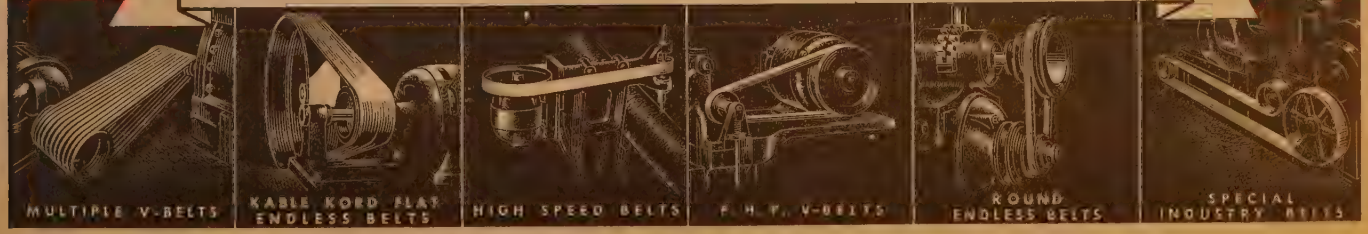
Your Gilmer Distributor is close at hand, ready to help you select the right belt for any drive. Write to us for a FREE copy of the Gilmer Guide, the most complete V-Belt catalog ever published.

L. H. GILMER COMPANY, Tacony, Phila. 35, Pa.
Division of United States Rubber Company

Get in touch with your Gilmer Distributor

Gilmer BELTS

THERE IS A GILMER POWER TRANSMISSION BELT FOR EVERY NEED



• Continued from page 168

tion men and management in selecting the right valve for right job. Ohio Injector Co.

65. BEARINGS—Bulletin #259A describes seal-type bearing made to standard single row SAE dimensions, thus simplifying application and saving space. Is designed to exclude dirt and retain the lubricant. SKF Industries, Inc.

66. ROLLER HEARTH FURNACES — Bulletin #SC-132 describes prepared atmosphere roller hearth furnaces for ferrous and non-ferrous bars, tube and strip. Accuracy of roller alignment under varying temperatures and high rate of heat input discussed; practical means of minimizing decarburizations and preventing scale in continuous furnaces is emphasized. Surface Combustion Corp.

67. ELECTRONIC COMPONENTS — Data sheets EC-24, EB-6, EC-22B, EC-23, provide electrical specifications, physical dimensions and typical circuit applications of germanium and silicon crystal diodes, hydrogen thyratons and high intensity flash tubes. Sylvania Electric Products Inc.

68. SIGNAL CLOCK—Bulletin describes electric signal clock controlled by steel pendulum with a period of ½ second. Accuracy said to be extremely high. Tells typical signal program which can be arranged; automatic signals can be suppressed completely on holidays. Maintenance is said to be oiling the clockwork and cleaning contacts once every 2 to 3 years. Landis & Gyr.

69. PACKING TIPS—Brochure #M-6737 entitled "Packing Tips" is designed to help in obtaining full measure of service life in the packings. Care of packings, installation, lubrication, simplified recommendation chart, types of joints—such information is given. United States Rubber Co.

70. PICKLING & WASHING—Bulletin entitled "Great Safety, Faster Production" concerns spray-type pickling and washing machine and recites advantages over old type dip method. B. F. Goodrich Co.

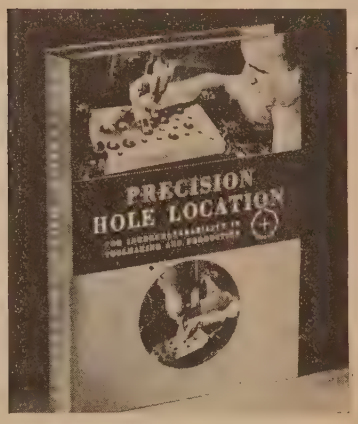
71. OIL PURIFICATION—Vol. 2, #3, of "Clean Oil" is pictorial publication devoted to oil purification. Gives case histories in plastics, metal products, drop forgings, grinding wheels and abrasives. Honan-Crane Corp.

HOW TO DO IT

72. INTER-COMMUNICATION— Complete line of inter-communication equipment made by company is described in 12-page catalog. Featured on special insert is new model which incorporates features previously found only in DeLuxe and other exclusive models and now available in low priced systems. Talk-A-Phone Co.

SEND DIRECT TO COMPANY FOR FOLLOWING

HOLE LOCATION—"Precision Hole Location for Interchangeability in Toolmaking and Production" is title of 448-page book, a valuable contribution to technical literature on toolmaking practices. Is compre-



hensive review of all hole-location practices and their evolution to present methods where the toolmaker can employ engineered methods and apply the principle of interchangeability to his own operation. Has over 400 photographs and working drawings, including 184 pages of Woodworth tables for converting holes from 3 to 100 on circles to rectangular coordinates. Price $3.00. Moore Special Tool Co., 740 Union Ave., Bridgeport 7, Conn.

NATIONAL FIRE CODE—The 1947 NFPA edition of the National Electrical Code is a collection of rules governing installation and, to a certain extent, the use of electrical equipment in an effort to reduce hazard from electrical fires and electrical accidents. Is in convenient desk reference size, 6" x 9"; has 408 pages. Title is "National Fire Codes Vol. V, National Electrical Code." Price $2.00. National Fire Protection Assn., 60 Batterymarch St., Boston 10, Mass.

LAMPS—76-page technical treatise, #LD-1, hailed as lamp user's "bible", 8½" x 11", has cream of technical data gathered from wide range of bulletins and articles of company. Features latest lamp developments and their practical applications to host of fields in industry, commerce, and home. Is condensed text on design and operation of incandescent, mercury and fluorescent light sources. Price 40c. General Electric Lamp Dept., Nela Park, Cleveland, Ohio.

INDUSTRIAL FILMS—Booklet, "Industrial Films — A Source of Occupational Information" analyzes 51 industrial films on know-how operations in 18 industries. Industrial personnel workers, instructors, and those concerned with training should find it helpful. Price 20c. Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.

Check Numbers of Literature Desired and Mail Order Form

MILL & FACTORY **FEBRUARY, 1947**
205 East 42nd Street
New York 17, N. Y.

Please send me immediately the literature listed below:

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61	62	63	64	65	66	67	68	69	70
71	72								

Name and Title .....

Company .....

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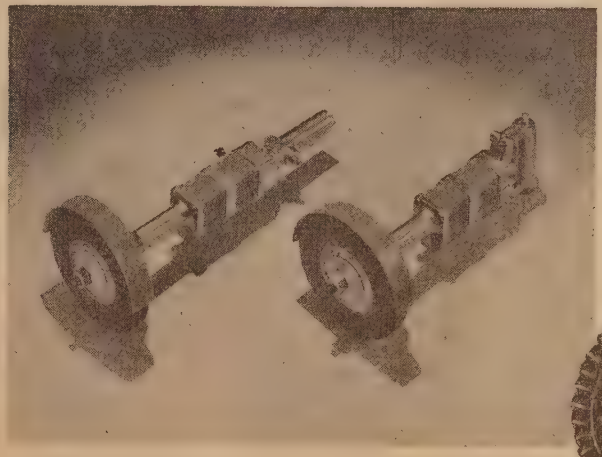
PLANT EQUIPMENT PREVIEWS

Latest New Products to Reduce Costs or Increase Production

EDITORIAL BOARD AWARD

Judges' Choice For February



AIR GRINDERS

Features: Two models, for 8" and 6" wheels respectively. Both are lightweight, 11¼ lbs. for the 8" size and 9¾ lbs. for the 6" size. Substantially more power is delivered at peak load and the simple construction makes both machines easy to service and maintain, A rotor governor idles the machine at the permissible, safety, free speed. The rotor governor opens quickly to deliver full air at high load speed. The 8" model is available at speeds of 4500 for 8 x 1 elastic wheels, 4100 for 6 x 1 vitreous and 3100 for 8 x 1 vitreous wheels. The 6" model is available in speeds of 6000 rpm for 6" elastic, 4100 for 6" vitreous and 6000 for 4" vitreous wheels.

Manufacturer: The Rotor Tool Company, 17325 Euclid Ave., Cleveland, Ohio.

JUDGES
WILLIAM A. PARKER, Chief Engineer
Dixon Valve & Coupling Co.
M. A. CAVANAUGH, Superintendent of Plant Maintenance
The Budd Company

HOW AWARDS ARE MADE

Each month the selection board certifies for previews the new plant equipment products that appear to be most useful for the industrial plant. Their choices are taken from a wide assortment of items carefully compiled by the editors after extensive research. Their selection is based on the newness of the product, its wide application and its ability to save time and money or improve working facilities.

Continued on following pages

FEBRUARY, 1947

PEP 2

PEDRIFUGAL PUMPS

Selection Board's Opinion: Can be mounted in any position.
Manufacturer: The Allis-Chalmers Mfg. Co., Milwaukee, Wisc.

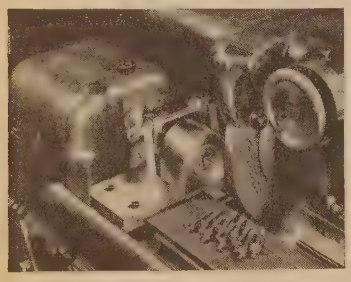
Features: These cast iron bronze fitted, pedestal-type centrifugal pumps come in 3 principal sizes: 1" x 1", 2" x 2", 3" x 3". Capacities are from 10 to 500 gallons per minute at heads of from 10 to 100 feet with power requirements from 1/4 to 15 hp. The pumps operate in any position.

FEBRUARY, 1947

PEP 3

COLLET FIXTURE

Selection Board's Opinion: Precision and easy to use quickly.
Manufacturer: Zagar Tool, Inc., 23880 Lakeland Blvd., Cleveland 17, Ohio.



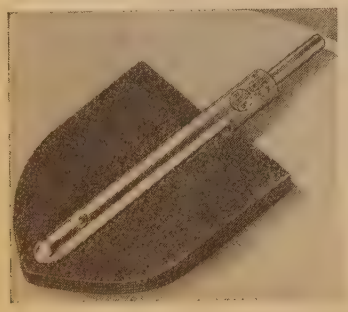
Features: Increases the usefulness and steps up the production of a standard plain grinding machine. Used to grind parts without centers, which can be held in collets, this tool runs on its ball bearings and is driven by the headstock of the machine. The collet can be opened and closed while the grinder is running. Steps production to 40 cranks per hour.

FEBRUARY, 1947

PEP 4

ABRADING PADS

Selection Board's Opinion: Useful for getting at inside surfaces.
Manufacturer: The Wilkinson Equipment Co., 109 East 69th St., Chicago 37, Ill.



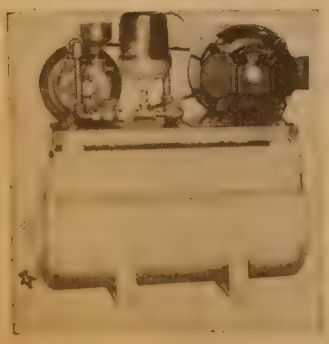
Features: Ideal for internal and external finishing. Clean and polish all types of materials. Other uses include internal grinding, deburring, chamferring, cleaning, finishing and polishing. Come in sizes from 1/2" x 2" up to 9" x 10" to accommodate openings from 1/4" to 6 1/2" in diameter. Available in grits from 24 to 320 grits.

FEBRUARY, 1947

PEP 5

AUTOMATIC WATER PUMP STARTER

Selection Board's Opinion: Self-priming feature a recommendation.
Manufacturer: Leiman Bros., Inc., 119-83 Christie St., Newark 5, N. J.



Features: A motor-driven vacuum pump unit to which may be attached an electric control switch for maintaining the required degree of vacuum in the reservoir tank. A vacuum relief valve, set to several degrees higher than the required degree in the tank, prevents the vacuum from going too high.

FEBRUARY, 1947

PEP 6

CAR PULLER

Selection Board's Opinion: Sturdy unit saving of time and effort.
Manufacturer: American Engineering Co., 2428 Aramingo Ave., Philadelphia 25, Pa.

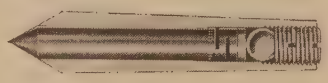
Features: This husky device spots railroad cars safely, quickly and easily at the press of a button. Replacing the back breaking pinch bar it has many other useful purposes, e.g. to bend pipe, move furnace cars, pull skids, etc. By its use, industrial accidents through overstrain, falls etc. are practically eliminated.

FEBRUARY, 1947

PEP 7

REVOLVING TIP LATHE CENTER

Selection Board's Opinion: Spindle center revolves.
Manufacturer: E. H. Vanderwall Co., 440 Golden Gate Ave., San Francisco, Cal.



Features: Simple and rugged in design, a hardened steel center spindle revolves within the steel taper shank, with exceptionally long bearing surface. Thrust is taken by a replaceable steel ball and thrust plate. Thrust end of spindle is slotted and spring is tempered to yield slightly under load, thus automatically compensating for expansion due to heating of work.

FEBRUARY, 1947

PEP 8

SHELL END MILLS

Selection Board's Opinion: Should give long life.
Manufacturer: The Vascoloy-Ramet Corp., N. Chicago, Ill.

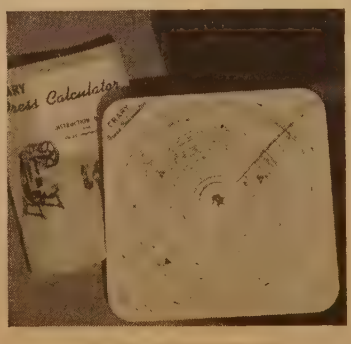
Features: A line of carbide tipped and of tantung tipped shell end mills, manufactured in right and left hand styles, ranging in size from 2 1/2" O.D. to 4 1/2" O.D. and bores 1" to 1 1/2". The carbide tipped shell end mills are available with negative radial and axial rake angles for milling steel and zero rakes for milling cast iron, non-ferrous or non-metallic materials.

FEBRUARY, 1947

PEP 9

PRESS CALCULATOR

Selection Board's Opinion: Rapid means of accurately calculating press set-up.
Manufacturer: The Calculator Co., Box 65, Teaneck, N. J.



Features: Provides a simplified method of selecting presses. Within a half hour, the average person can learn to figure ordinary jobs quickly. It is only necessary to set the dials on the calculator and answer is automatically computed. The Calculator measures 9 1/2" x 9 1/2" and is made of non-warping "vinylite" plastic.

• Continued on page 176

STEP UP — SHEET METAL SHEARING SAVE MONEY, MUSCLE, MANPOWER

*Trade Mark Reg. U. S. Pat. Off.

BLACK & DECKER Electric PORTO-SHEARS combine powerful shearing action with surprisingly rapid speed. They cut sheet metal too tough for snips. Speed up jobs where snips are slow. Feed easily with only a light forward pressure.

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LEADING DISTRIBUTORS EVERYWHERE SELL

Black & Decker

PORTABLE ELECTRIC **TOOLS**

• Continued from page 174

FEBRUARY, 1947

PEP 10

TOOL BITS

Selection Board's Opinion: New line with many uses.
Manufacturer: Kennametal Inc., 1 Lloyd Ave., Latrobe, Pa.

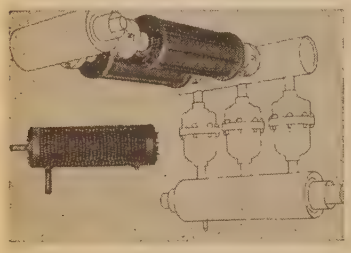
Features: For use in knee attachments of turret lathes, these bits are available in a range of carbide compositions, for machining steel, cast iron, and non-ferrous metals. Sizes: 1/2" x 3 1/2"; 5/8" x 4"; 3/4" x 4 1/2".

FEBRUARY, 1947

PEP 11

ARIDIZER

Selection Board's Opinion: Affords high precision and temperature control.
Manufacturer: Goodyear Industries Inc., 224 S. Michigan Ave., Chicago 4, Ill.



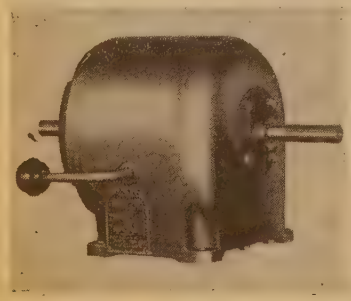
Features: In one unit it offers the principle of heat transfer for the heating of both air and gases as well as for the preheating of steam. Temperatures up to 1000 degrees F can be maintained with control of leaving temperatures held to within plus or minus 1 deg. F. Of particular value to food processing industries, rubber, chemical and printing.

FEBRUARY, 1947

PEP 12

GEAR SHIFT DRIVE

Selection Board's Opinion: Gives variable speeds.
Manufacturer: The Lima Electric Motor Co., Lima, Ohio.



Features: Designed to motorize machinery requiring selective speeds and suitable for any standard motor of 1/4" to 1 hp rating. Gear ratios are 1 to 1, 1.33 to 1, 2 to 1 and 4 to 1. These ratios are such that speed changes occur in even steps. Type is of 4 speed transmission.

FEBRUARY, 1947

PEP 13

2-OUNCE PLASTICS MOLDING MACHINE

Selection Board's Opinion: Easy to operate and control.
Manufacturer: Hydraulic Machinery Inc., Dearborn, Mich.

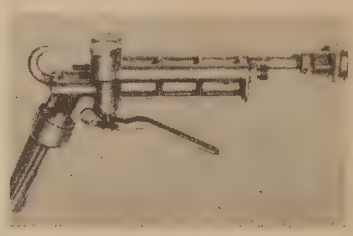
Features: Two electronic controls regulate the heat in the chamber and nozzle indefinitely without danger of burning the material. A new type electronic control mounted on the machine panel guarantees accuracy of plus or minus 2 degrees. Ideal for production of small units of automotive body appointments, toys, novelties, etc.

FEBRUARY, 1947

PEP 14

AIR AND WATER GUN

Selection Board's Opinion: Gives high pressure.
Manufacturer: Turco Products, Inc., 6135 S. Central Ave., Los Angeles 1, Cal.



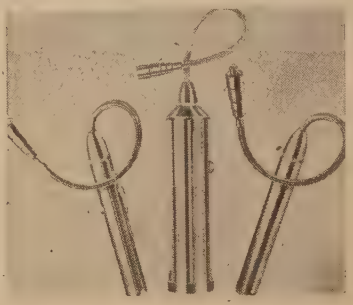
Features: Completely controlled by a finger-tip lever without necessity for valve adjustments. Particularly suitable for use in garages, repair units in the automotive and aircraft fields etc. Operates on regular air and water pressures and connects to standard fittings. Invaluable in loosening dirt or grease from inaccessible parts of equipment and machinery.

FEBRUARY, 1947

PEP 15

FLEXIBLE TUBE FLASHLIGHTS

Selection Board's Opinion: Many possible uses.
Manufacturer: Aero-Motive Mfg. Co., 1803 Alcott St., Kalamazoo 24, Mich.



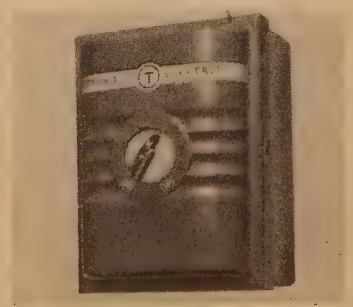
Features: These long, flexible tube extension bulb-retainers can be introduced into heretofore inaccessible areas, providing a powerful beam of shadowless light.

FEBRUARY, 1947

PEP 16

ENCLOSED SAFETY SWITCH

Selection Board's Opinion: Compact design.
Manufacturer: The Trumbull Electric Mfg. Co., Plainville, Conn.



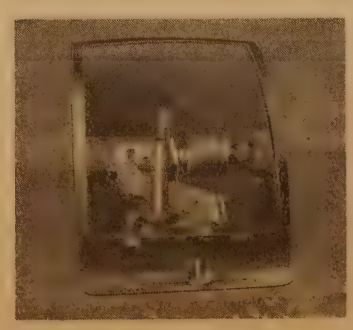
Features: Rated at 30 amperes and compactly contained in a box that measures only 4 1/2" wide x 6 1/8" long x 3 1/4" deep. A uniquely designed handle gives the switch front operation and its attached triple duty spring takes up any loose tolerance in the switch. The pivoting lever may be padlocked in the "off" position to prevent unauthorized tampering.

FEBRUARY, 1947

PEP 17

LATHE GUARD

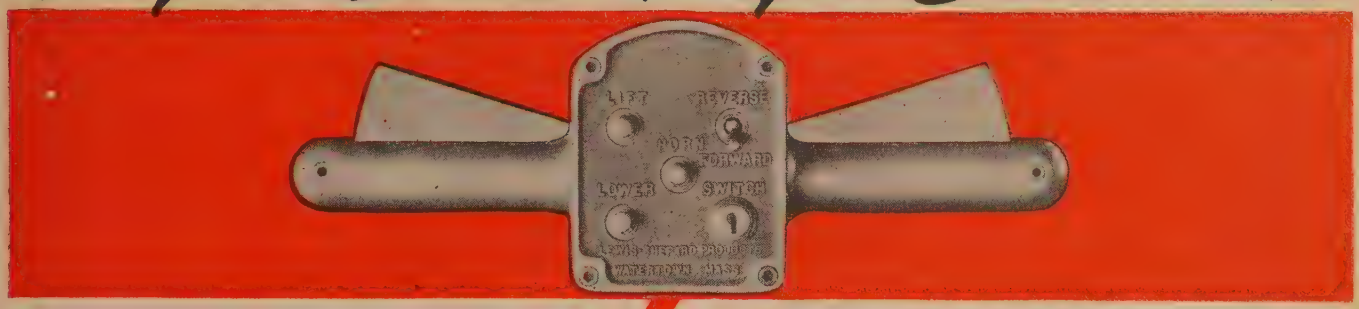
Selection Board's Opinion: Eliminates need of goggles.
Manufacturer: The Standard Safety Equipment Co., 232 W. Ontario St., Chicago 10, Ill.



Features: This lathe and wheel guard permits continuous work inspection with safety by protecting the operator from danger of flying particles and oil without obstructing work or vision at point of operation. A universal attachment on base permits setting the chip guard at any desired angle.

• Continued on page 178

They're New!... They're Exclusive!!



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- **MASTER ELECTRIC BRAKE**
  'Deadman' Control applies instantaneously and smoothly with Master Control Handle in any position... *When power is off, brake is on!*
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  Easily replaceable in 20-30 minutes—A big boon to fleet owners.

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• Continued from page 176

FEBRUARY, 1947

PEP 18

MASONRY DRILL BITS

Selection Board's Opinion: Durable and gives free cutting.
Manufacturers: New England Carbide Tool Co., Cambridge 39, Mass.

Features: The complete kit consists of 6 bits for drilling concrete, brick, slate and general masonry. Deeper flutes permit the cuttings or powder residue, which is abrasive in action, to escape more freely from the hole making the bit freer cutting. Drill 4 to 8 times faster and outlasts ordinary bits 50 to 1.

FEBRUARY, 1947

PEP 19

THERMOSETTING SILICONE RESIN

Selection Board's Opinion: Withstands high temperature.
Manufacturer: Dow Corning Corp., Midland, Mich.

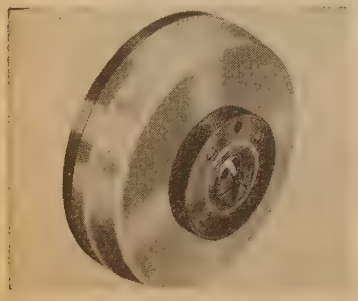
Features: Developed for use as a heat-stable bonding material for inorganic fabrics in the production of rigid electric laminates. Also effective for bonding finely divided particles such as powdered metals or mica, silica or carbon. Has high heat stability, low water absorption, and resists carbon tracking.

FEBRUARY, 1947

PEP 20

COLLET CHUCK

Selection Board's Opinion: High pressure without distortion.
Manufacturer: Modern Collet & Machine Co., Ecorse, Mich.



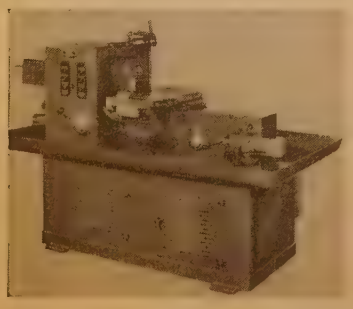
Features: Gripping pressure of collet is adjustable in 12 positive steps from zero to 15,000 lbs. The thin walled tubing can be held without distortion. The collet is closed by spring action with positive, uniform force, and is opened by a compressed air jet (100 p.s.i. line pressure). Overall length of chuck, including collet is 2¾"; weight is 11½ lbs.

FEBRUARY, 1947

PEP 21

SEMI-AUTOMATIC LATHE

Selection Board's Opinion: Easy to operate and has numerous possible applications.
Manufacturer: The Oster Mfg. Co., Cleveland 3, Ohio.



Features: A single spindle machine equipped with four speed motor, hydraulic feeds and semi-automatic features with all controls, including push button station, located conveniently for the operator. The four speed motor has operating rating of 7½ hp maximum. Weighs 3,000 lbs; height 50"; width 44½"; length 79".

FEBRUARY, 1947

PEP 22

INDUCTION HEATING APPLIANCES

Selection Board's Opinion: Good for application where induction heat must be brought to bear.
Manufacturer: The Ohio Crankshaft Co., Cleveland, Ohio.

Features: Consist of four units: (1) The "Tocco Heat Gun", a portable inductor; (2) a 30,000 cycle motor generator type induction heating unit; (3) a variable ratio transformer; (4) a 7½ KW output, 3 megacycle induction heating unit.

FEBRUARY, 1947

PEP 23

TOOL FOR RECLAIMING OLD LUMBER

Selection Boards Opinion: Very good for conserving lumber.
Manufacturer: Maco Corp., Huntington, Ind.

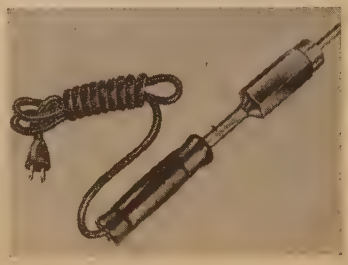
Features: The tool lifts flooring, siding, roofing and other wood with such care that no cracks, splits or breaks occur to lower its value. When butted against the boards to be removed, the tool hugs adjacent studding and the extended lips support it for leverage giving equal distribution of pressure, which lifts entire board without cracking or splitting.

FEBRUARY, 1947

PEP 24

SOLDERING IRON

Selection Board's Opinion: Small tip.
Manufacturer: Hexacon Electric Co., 140 W. Clay Ave., Roselle Park, N. J.



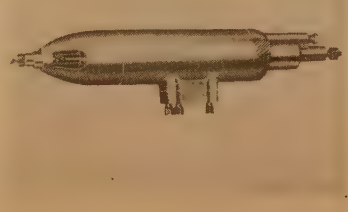
Features: Wound for 300 watts but has a ⅜" instead of the conventional ⅞" diameter tip, thus reducing the expense of tip replacement. Due to hexagon shape, iron can be held in vice when replacing tip without danger of denting housing. The iron is equipped with 6 ft. 10,000 cycle approved heater cord and rubber plug.

FEBRUARY, 1947

PEP 25

DRILLS

Selection Board's Opinion: Easy to use with jig set-up.
Manufacturer: Valley Tool Co., Huntington Park, Cal.



Features: Eliminate drill presses and many special machines to support drilling units in multiple drilling. Adaptor drill bushings support these units on the drill jig and no other support is necessary. Drills consist of a standard rotary pneumatic drill motor mounted in a 2-way air cylinder. Capacities up to 1"; speed up to 5000 rpm.

• Continued on page 180

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• Continued from page 178

FEBRUARY, 1947

PEP 26

BORING BAR SET AND HOLDER KIT

Selection Board's Opinion: A complete set.
Manufacturer: Bruno Tools, 9330 S. Monica Blvd., Beverly Hills, Cal.

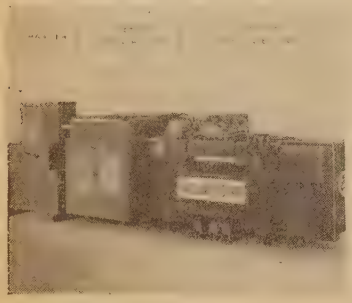
Features: Kit consists of an adjustable boring bar holder with a capacity of 3/16" to ¾" and a boring bar set in an attractive plastic case consisting of ¼", ⅜" and ½" boring bars, each with an exclusive lever-lock grip which clamps the bit with equal pressure along the entire holding channel and the full diameter of the bar.

FEBRUARY, 1947

PEP 27

STORAGE BATTERY POWERED FLASH WELDERS

Selection Board's Opinion: Storage battery operated.
Manufacturer: Progressive Welder Co., 3050 E. Outer Drive, Detroit 12, Mich.



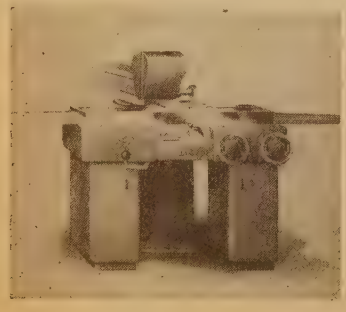
Features: Developed for the flash welding of aluminum, is pioneering in applying "stored energy" in production to solve the problem of flash welding. Can also be used in welding of other metals, particularly where semi-portability of welder and power supply is an important consideration.

FEBRUARY, 1947

PEP 28

BROACH SHARPENING MACHINE

Selection Board's Opinion: Simplifies sharpening of broaches.
Manufacturer: Colonial Broach Co., Box 37, Harper Station, Detroit 13, Mich.



Features: Makes it possible for tool grinders to sharpen flat surface broaches even several feet long while comfortably seated and relaxed. The grinding wheel spindle can be operated at various speeds from 4,000 to 10,000 rpm through the use of interchangeable pulleys. Safety of operation increased as operator does not need to reach across machine to adjust it.

FEBRUARY, 1947

PEP 29

THICKNESS GAGE

Selection Board's Opinion: Easy to use and has high accuracy.
Manufacturer: Branson Instruments Inc., Joe's Hill Rd., Danbury, Conn.

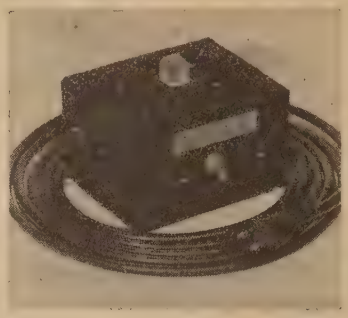
Features: A portable, self contained instrument for measuring thickness of many materials, including steel from one side only. It utilizes a crystal-type gage head, powered by a frequency-modulated electronic oscillator. When applied to a wall surface, mechanical resonance of the wall thickness can be produced directly below the crystal. Covers range from ⅛" to 12".

FEBRUARY, 1947

PEP 30

MULTI-PLUG OUTLET BOX

Selection Board's Opinion: Gives many possible outlets.
Manufacturer: Allied Laboratory Instrument Inc., 355 W. 26th St., New York 1, N. Y.



Features: Solves problem of coping with an insufficient number of wall outlets. A small unit, containing 8 standard receptacles, it can be plugged into any convenient wall outlet AC or DC, 110-125 volts. Cabinet dimensions are 3" x 4" x 5". Net weight 1 lb. 9 oz.

FEBRUARY, 1947

PEP 31

TWO-WAY SLIDING TABLE

Selection Board's Opinion: Many possible applications.
Manufacturer: Leo G. Brown Engr. Co., 1127 Riverside Drive, Los Angeles 31, Cal.

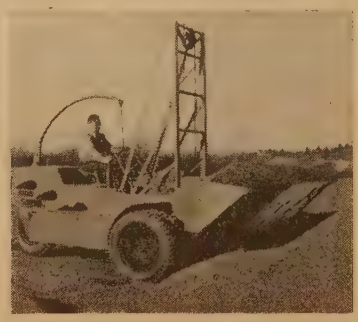
Features: A heavy-duty precision built table with an accurately gauged travel of 5" in each direction and designed for quick mounting to any drill press. Table top is 7½" square and is fitted for T-bolt heads. It is 3¾" high overall and weighs only 24 lbs.

FEBRUARY, 1947

PEP 32

MATERIALS HANDLING MACHINE

Selection Board's Opinion: Handy for handling bulk products.
Manufacturer: Mixermobile Manufacturers, 6853 N. E. Halsey St., Portland 15, Ore.



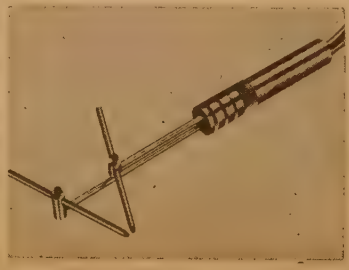
Features: A tricycle type materials handling machine, accomplishing complete control of the bucket by means of 2 hand levers controlling an entirely new pick-up, hoisting, and discharging mechanism. Operator can pick up a full load from a stock pile without "shock loading." Weighs 5300 lbs, overall length 14', turning radius 9'.

FEBRUARY, 1947

PEP 33

ARC TORCH

Selection Board's Opinion: Provides soft intense heat with no pressure blow.
Manufacturer: Cesco Products Inc., 30 N. La Salle St., Chicago 2, Ill.



Features: Can be used with both AC and DC welders and greatly widens the scope of electric welders permitting them to be used for jobs formerly requiring gas welders. A soft intense heat with no pressure blow or oxides is characteristic of the carbon arc flame produced. Welds aluminum and virtually all ferrous and nonferrous metals.

• Continued on page 182

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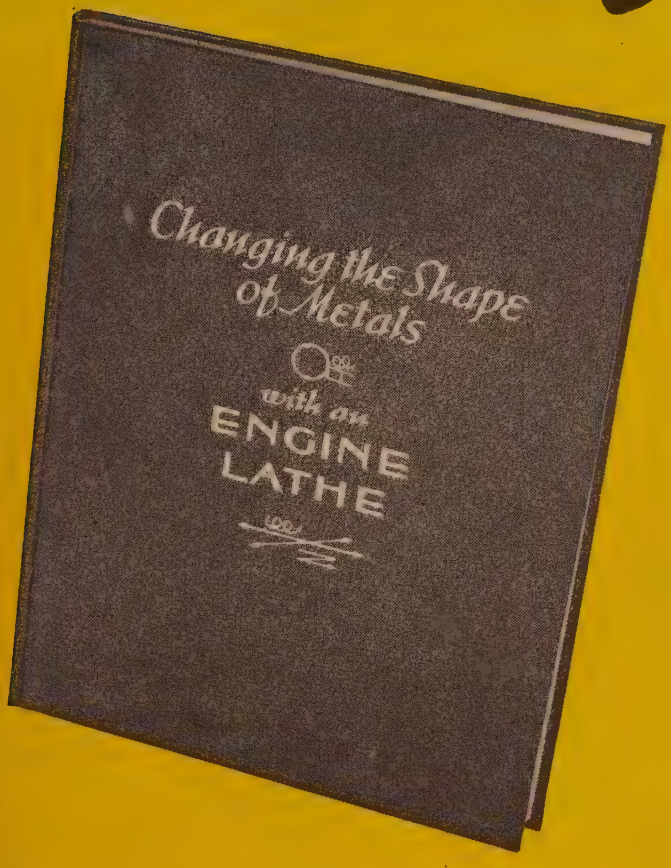

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3. Getting Acquainted with an Engine Lathe.
4. Getting Acquainted with Lathe Tools.
5. Performing Common Lathe Operations.
6. Common Lathe Jobs and How to Produce Them.
7. Getting the Most Out of an Engine Lathe.
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• Continued from page 180

FEBRUARY, 1947

PEP 34

VARIABLE SPEED POWER DRIVE

Selection Board's Opinion: Wide range unit of lightweight and compact design.
Manufacturer: The Flinchbaugh Co., 750 Court St., York, Pa.

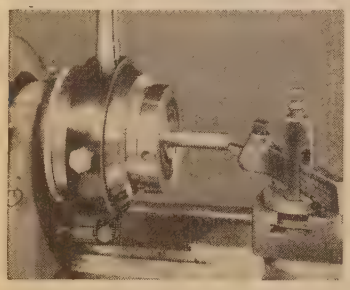
Features: Meets any fractional hp. drive requirement. Has a range of 20 to 750 rpm with 1725 rpm motors. Can get down to 4 rpm with additional auxiliary shaft. Base and housing of aluminum, for light weight—12 lbs.

FEBRUARY, 1947

PEP 35

LEVER OPERATED COLLET CHUCK

Selection Board's Opinion: Positive and straight parallel grip.
Manufacturer: Porst Bros., 259 N. California Ave., Chicago 12, Ill.



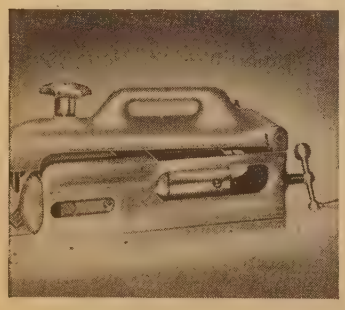
Features: Has a capacity up to 1" and insures a positive, straight parallel grip on the work at all times, and a steadier hold through the full length of the collet bearing to compensate for work irregularities. A knurled hand operated selective adjusted ring with rapid self-locking positions maintains a set pre-determined pressure and assures a solid grip.

FEBRUARY, 1947

PEP 36

PORTABLE METAL CUTTING SAW

Selection Board's Opinion: Easy to use in tight places.
Manufacturer: Machine-Craft Mfg. Co., 3805 Avalon Blvd., Los Angeles 11, Cal.



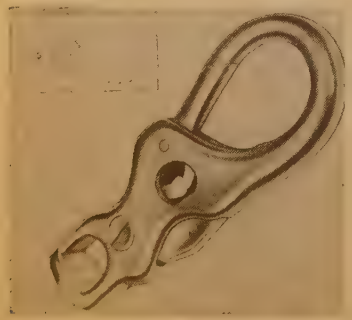
Features: A perfect all-around tool for cutting off pipe, conduit and solid bars of ferrous and non-ferrous metals. Will cut flush and square to any wall or surface. Cuts any size or shape of stock to 2⅜" O.D.

FEBRUARY, 1947

PEP 37

SELF-LOCKING DEVICE FOR HOOKS

Selection Board's Opinion: Good safety device.
Manufacturer: W. H. Foster, 4622 Kingswell Ave., Los Angeles 27, Cal.



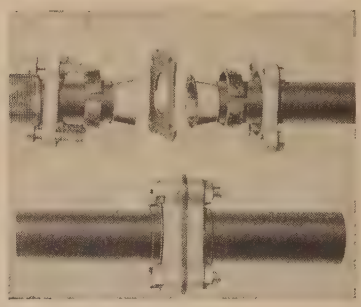
Features: Has a fulcrum latch member that closes the opening into the hook and is retained in this closed position, so that it cannot be accidentally swung forward as a result of the latching finger being struck on the outside by an extraneous object. The lock can be adapted to nearly all hooks where positive couplings, that are readily releasable, are needed.

FEBRUARY, 1947

PEP 38

FITTINGS FOR STAINLESS TUBINGS

Selection Board's Opinion: Useful for stainless steel and aluminum tubing.
Manufacturer: Tri-Clover Machine Co., Kenosha, Wisc.



Features: Developed primarily for the chemical process industries, these lightweight fittings are applicable wherever liquid conveying lines require corrosion-resistant properties. A complete line of ells, tees, crosses, return bends, Y's, laterals, adapters, etc., is manufactured for use with commercial tolerance stainless steel tubing of outside diameter of 1", 1½", 2", 2½", 3" and 4".

FEBRUARY, 1947

PEP 39

HAND VISE

Selection Board's Opinion: Small and easy to use without marring product.
Manufacturer: The Chicago Tool & Engineering Co., 8383 S. Chicago Ave., Chicago 17, Ill.

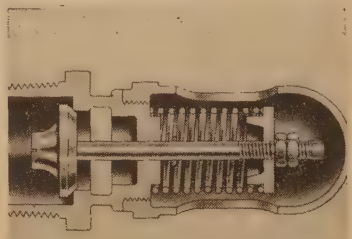
Features: An aluminum hand vise, which grips solidly, yet will not scratch or mar the work. Only 7 oz. in weight and 5" long. The 1½" wide jaw faces which open to 1½" are accurately machined to provide a true surface.

FEBRUARY, 1947

PEP 40

VACUUM BREAKER

Selection Board's Opinion: Gives good protection.
Manufacturer: Associated Valve & Engr. Co., 1150 W. Marquette Rd., Chicago, Ill.



Features: Prevents collapse by admitting air into the unit when the inside pressure becomes sub-atmospheric beyond a certain point. Will give extra protection for jacketed kettles, closed tanks, hot water generator coils and heating units. Furnished in 6 sizes from ½" pipe thread connection and overall height of 4⅛" to 2" pipe thread and 6¼" overall height.

FEBRUARY, 1947

PEP 41

RUBBER-FRAME GOGGLE

Selection Board's Opinion: Comfortable with good visibility.
Manufacturer: American Optical Co., Southbridge, Mass.

Features: Provides especially wide-angle vision, good ventilation and long wearing comfort. It may be worn directly over the eyes or over most types of prescription glasses. Recommended for jobs requiring handling of acids and caustics, it protects against chemical splashes or fine dust concentrations.

• Continued on page 184

How a Disstoneer reduced saw-sharpening from once every hour to once every 75 hours

It was in the plant of Allwoods, Inc., Toledo, Ohio, where plywood of various kinds and thicknesses is cut in shapes for radio cabinets, toys and other products. The company had been using a combination circular saw which required resharpening every 1 to 1½ hours, with a down time of 5 to 10 minutes. Even after resharpening, the saw would cut rough after the first few cuts and considerable sanding was necessary.

The Disstoneer* who studied the problem recommended a Disston Inserted-section Carboloy-fitted Saw with alternate beveled teeth. After 75 hours of use, without resharpening, the Carboloy-fitted saw cut as smoothly and easily as when first placed on the machine. Cutting was faster, sanding costs reduced, results more uniform and production increased.

One company executive stated that in all his experience with cutting tools, this saw was the only tool he ever bought that out-performed the manufacturer's claims and surpassed his own most optimistic expectations.

STEEL . . . Everybody who wants to obtain steel, can help himself to get it by immediately starting scrap into the channels that serve steel mills.

*DISSTONEER—a man who combines the experience of Disston leadership and sound engineering knowledge, to find the *right tool* for you—to cut wood, to cut metal and other materials —and TO CUT YOUR COST OF PRODUCTION—*not only on special work, but on ordinary jobs as well.*

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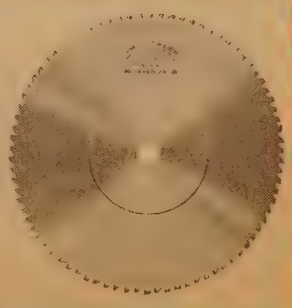
DISSTON INSERTED SECTION CARBOLOY FITTED SAW

Used in many manufacturing plants for sawing plywood, asbestos pipe covering, aluminum, cardboard, laminated phenol resinoid products, many others. Teeth are held firmly in place, eliminating up and down or lateral movement. Large open gullets allow free discharge of sawdust, reducing friction and permitting faster feed.



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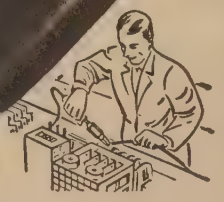
Western Electric



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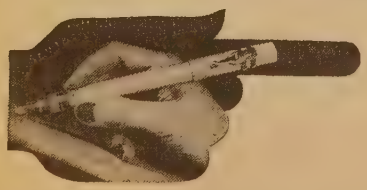

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Bulletins	Labeling	Stock marking
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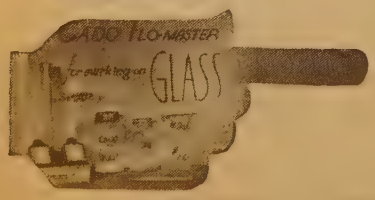

FLO-MASTER writes small or large—stroke 1/16" to ⅜" wide. Marks on paper, wood, metal, burlap, cotton bales, cartons, girders, beams, pipe, bars, etc. Both opaque and transparent inks for dark and light surfaces —including asphalt coatings.

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Plant Equipment Previews

(Continued from page 182)

FEBRUARY, 1947
PEP 42

ELECTROFLUID DRIVE

Selection Board's Opinion: Compactly packaged power unit.

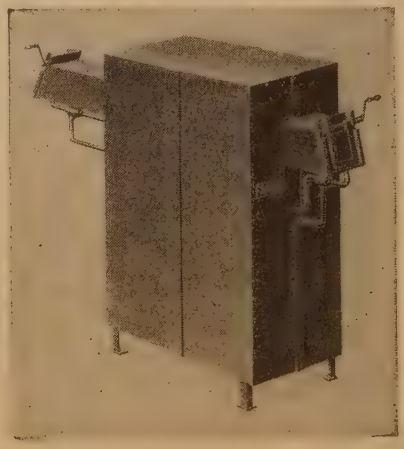
Manufacturer: Link Belt Co., 307 N. Michigan Ave., Chicago 1, Ill.

Features: A neat, compact, motorized hydraulic combination consisting of a general purpose A.C. induction motor flange-mounted on a sturdy housing containing a hydraulic coupling. Its output may be direct-connected to the driven machine or to a speed reducer unit. It may also be connected to driven machine through the medium of chain, gear or belt drives.

FEBRUARY, 1947
PEP 43

BOX FURNACE

Selection Board's Opinion: Easy to control temperature accurately.



Manufacturer: General Electric Co., Schenectady, N. Y.

Features: Meets modern laboratory requirements for high, automatically-controlled temperatures. Suitable for operation up to 3100 degrees F, the furnace can be used in such applications as melting and bright annealing of metals, sintering of powdered metals, ceramic firing, copper and silver alloy brazing of metals, etc. Heating units rated at 20kw, 60 v. at 3100 deg. F.

(Continued on page 187)

Plant Equipment Previews

(Continued from page 184)

FEBRUARY, 1947
PEP 44

STENCIL CABINET

Selection Board's Opinion: Steel construction gives many advantages.

Manufacturer: Diagraph-Bradley Stencil Machine Corp., 3746 Forest Park, St. Louis, Mo.

Features: Made of heavy gauge steel, reinforced so that it is capable of holding any size stencil machine. Each of its large size drawers has space for 600 cut stencils and come equipped with alphabetical dividers. Top of cabinet is 30" from floor enabling shipping clerk to reach cut stencils without stooping.

FEBRUARY, 1947
PEP 45

ALL-PLASTIC FOLDING SPECTACLE

Selection Board's Opinion: Folds compactly.

Manufacturer: Watchemoket Optical Co., Inc., Providence 3, R. I.

Features: The semi-rimless type frame is hinged to fold at the bridge. A hollow, stainless-steel temple telescopes to 1/3 normal length so that entire goggle folds to size of a pack of cigarettes. Lenses are of shatterproof plastic, especially resistant to high velocity impact.

(Continued on page 188)

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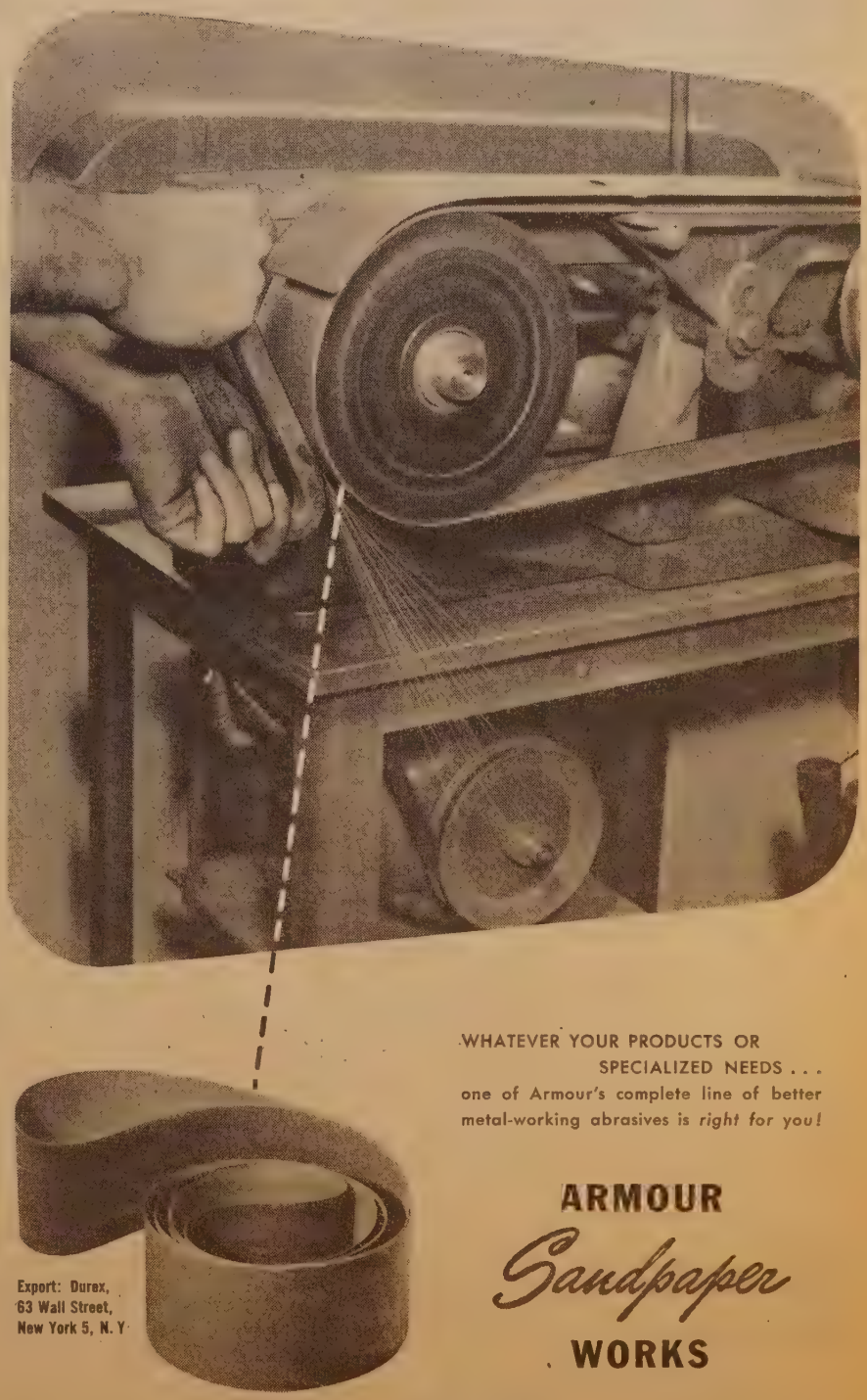
with an ARMOUR Alundum Cloth Belt



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Super Alloy Grade, Premium Priced Shovels of final cost economy. Mo-lyb-den-um Alloy Steel Blades, heat treated, Brinell tested, XX Grade Northern White Ash Handles, smoothly sanded, thoroughly waxed Unconditionally Guaranteed! . . . to outwear any other shovels made.
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The undisputed Quality Leader among all lowest price shovels. Carbon Steel Blades, heat treated. Serviceable No. 1 Grade Handles, smoothly sanded, thoroughly waxed.
Buyers Digest . . . of Exclusive Construction Features
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• D handle types equipped with patented Moly D Handle . . . the strongest, most comfortable handle made.
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Guaranteed!
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THE WOOD SHOVEL AND TOOL CO., Piqua, Ohio
A National Organization Specializing Exclusively in
SHOVELS SPADES SCOOPS

Plant Equipment Previews

(Continued from page 187)

FEBRUARY, 1947
PEP 46

HOT DIP TANK FOR PLASTIC COATINGS

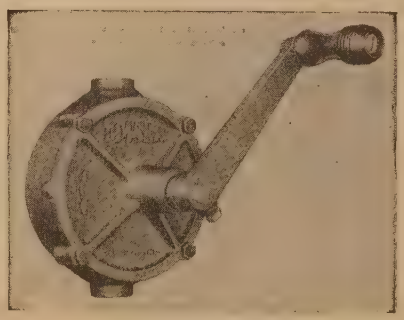
Selection Board's Opinion: Compact and complete unit.

Manufacturer: Aeroil Products Co., 5701 Park Ave., West New York, N. J.
Features: Variable speed mechanical agitation is provided throughout entire contents of tank by means of air powered, ball bearing, no-clogging turbine motors. Both tanks and cover are heavily insulated to conserve heat during non-dipping periods. Built-in dial and thermostat provide for swift check of oil bath temperatures.

FEBRUARY, 1947
PEP 47

ROTARY HAND PUMP

Selection Board's Opinion: Handy to use.



Manufacturer: Bowser Inc., Fort Wayne, Ind.
Features: Has a capacity of 10 GPM at normal cranking speed and is of the vane type with an aluminum rotor, graphite carbon vanes and stainless steel springs. Suction and discharge ports are threaded for ¾" iron pipe.

FEBRUARY, 1947
PEP 48

DRY DEVELOPING MACHINE

Selection Board's Opinion: Many improvements.
Manufacturer: General Aniline and Film Corp., Johnson City, N. Y.
Features: Reproduces photographic material from translucent film positives which can be made from any negative. Delivers prints at speeds 65 times as fast as copies

(Continued on page 190)

AMMCO 7" SHAPER — A Precision Machine

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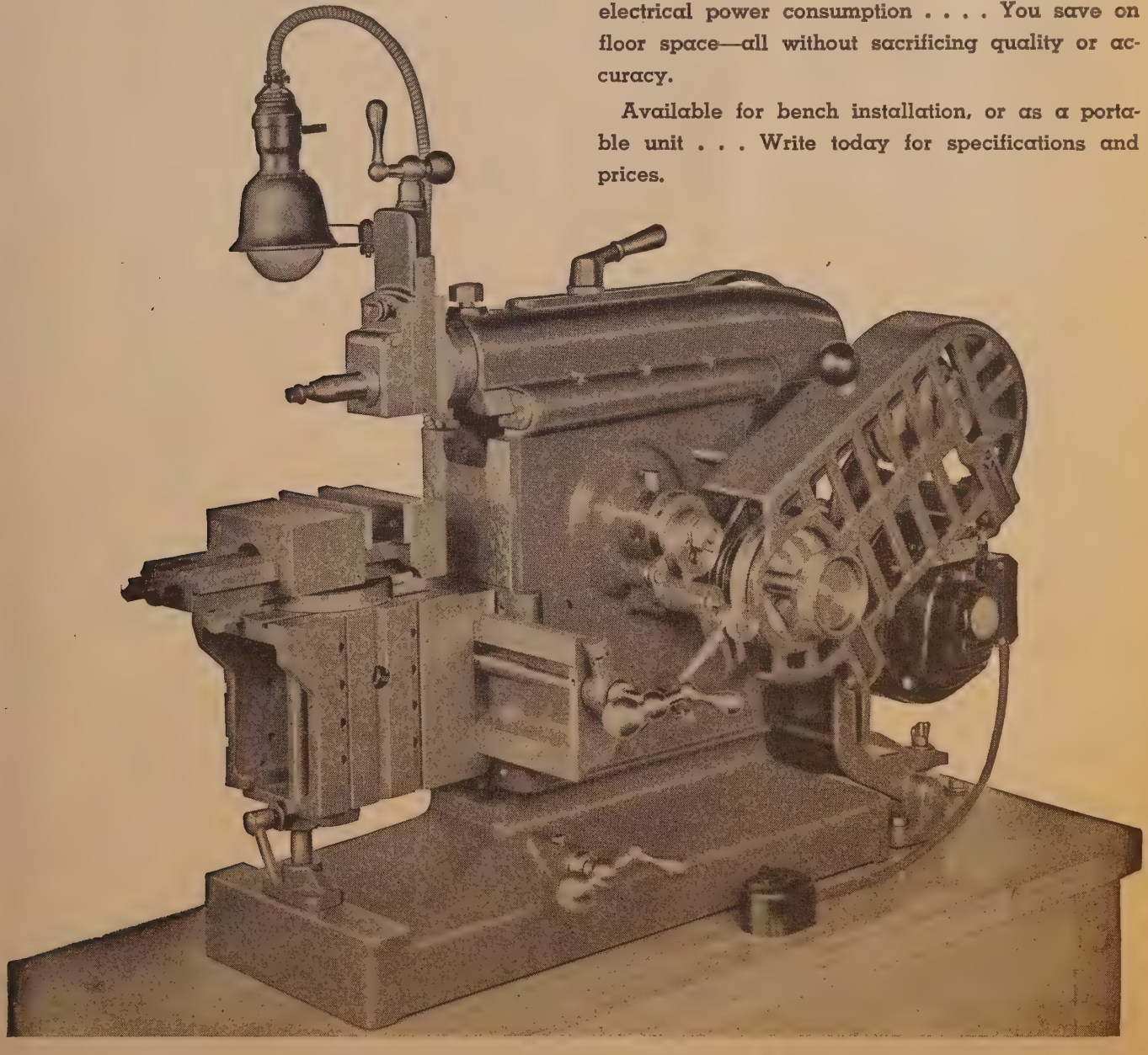
The accuracy of work turned out on an Ammco 7" Shaper assures precision production unsurpassed by larger machines selling for hundreds of dollars more than the Ammco . . . In addition to low initial cost, you also effect big savings in time and expense on set-up operations . . . You save on electrical power consumption . . . . You save on floor space—all without sacrificing quality or accuracy.

Available for bench installation, or as a portable unit . . . Write today for specifications and prices.



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VICTOR MOLY HIGH SPEED
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FRAMES

BAND SAWS
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Makers of Hand and Power Hack Saw Blades, Frames and Metal Cutting Band Saw Blades

Plant Equipment Previews

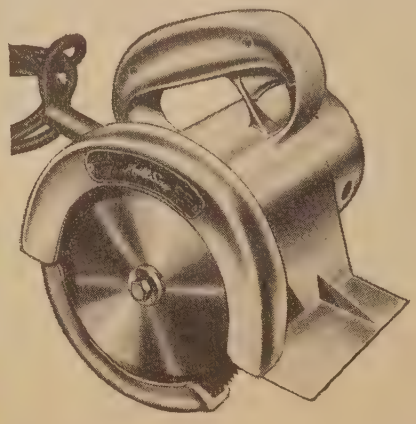
(Continued from page 188)

produced photographically. Only 25 seconds to reproduce standard-sized engineering drawings, accounting reports, file cards, photographic film positives and other translucent originals.

FEBRUARY, 1947
PEP 49

POWER SAW

Selection Board's Opinion: Lightweight.

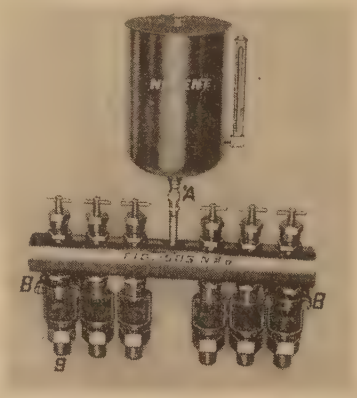


Manufacturer: Mall Tool Co., 7715 S. Chicago Ave., Chicago 19, Ill.
Features: A 6" portable electric hand saw weighing only 8¾" lbs. Aluminum alloy die cast housings make the saw easy to handle and give it better balance for use in either hand. The 6" blade has cutting capacity up to 2". Electric motor turns the saw blade at 3000 rpm at full speed load. Operates on 115 V. AC-DC.

FEBRUARY, 1947
PEP 50

MULTIPLE OILER

Selection Board's Opinion: Easy to oil many bearings.



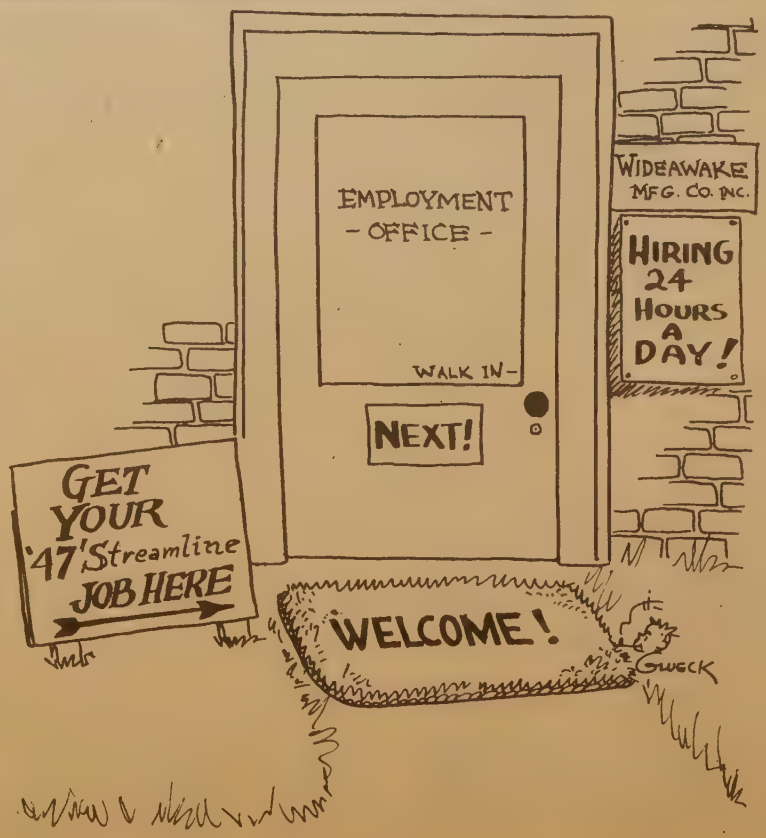
Manufacturer: Wm. W. Nugent & Co., Inc., 410-12 N. Hermitage Ave., Chicago 22, Ill.
Features: A heavy-duty multiple oiler with a reservoir tank capacity of 3 pints. Available with a string of sight feed valves in multiples of from 2 to 23 feeds. Can be used on any machine that requires drop feed or small stream.

FEBRUARY, 1947
PEP 51

DRILL JIG

Selection Board's Opinion: Simplifies drilling operations.
Manufacturer: McCullough Mfg. Co., 12709 Gratiot St., Detroit 5, Mich.
Features: Accurately accommodates drills up to ½" diameter. A set of 6 bushings,

(Continued on page 192)



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THE MOST COMPLETE LINE OF DROP-FORGED WIRE ROPE AND CHAIN FITTINGS

Plant Equipment Previews

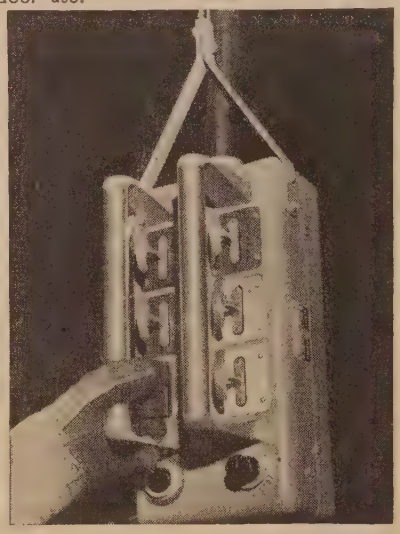
(Continued from page 190)

from 1/16" to 3/8" inc. are part of each outfit. To drill 1/2" holes the jig is used without bushings. Size of drill jig is 4 1/2" x 3" x 1 1/2". It is case hardened and ground all over and will withstand a lifetime of usage.

FEBRUARY, 1947
PEP 52

CRANE CONTROL

Selection Board's Opinion: Useful for outdoor use.

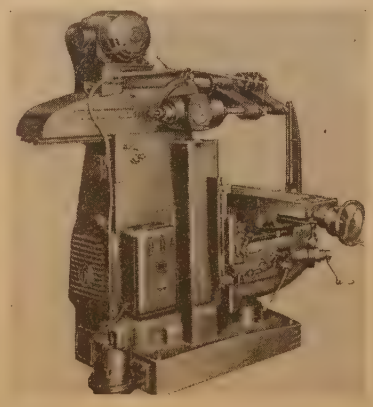


Manufacturer: General Electric Co., Schenectady, N. Y.
Features: This pendant pull station control for floor operated cranes can be furnished for use on AC or DC with motors up to 15 hp at 220 volts on cranes ranging in size from simple hoists to three motion bridges. It provides them with the smooth operation, and control refinements of cab operated cranes.

FEBRUARY, 1947
PEP 53

MILLING MACHINE

Selection Board's Opinion: High column is good feature.



Manufacturer: The Van Norman Co., Springfield 7, Mass.
Features: Designed for use in pattern shops, tool rooms, tool and die shops, etc. Among outstanding advantages of machine is the higher column which provides

(Continued on page 194)

There's No

"CURE-ALL" IN CUTTING OIL SANITATION

Coolant Formulations and shop conditions vary widely—so do coolant handling problems. To prevent costly coolant spoilage with its foul odors and other disagreeable features, to maintain practical sterility, your Dolge Service Man is prepared to render this service:

1—He will take samples of your coolant.

2—The Dolge Laboratories will examine them bacteriologically and chemically, *without charge.*

3—You will receive a complete confidential report, including the bacterial count.

Only then, and when found necessary, the *particular* DOLGE STERIDOL GERMICIDE to fit your requirements will be recommended. Employed as directed, the preparation will not irritate the skin or corrode metals . . . and it will prevent spoilage.

The cost? *Less than 1 cent per gallon of coolant!*

Write for booklet, "Cutting Oil Sanitation."

THE **C. B. DOLGE** CO.
WESTPORT, CONNECTICUT

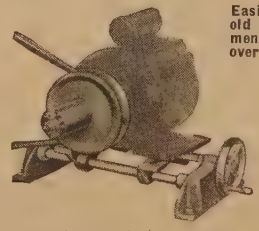
STERIDOL *Cutting oil germicides*

DEATH TO DISEASE
DOLGE

LOW COST SPEED CONTROL

LOVEJOY IDEAL CHICAGO

VARIABLE SPEED **TRANSMISSIONS**

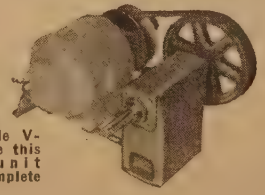


Easily installed in old or new equipment. Standard with over 50,000 users.

V-BELT SERIES

For fractional h.p. drives. Full contact all pitch diameters. Balanced against noise and vibration.

WIDE V-BELT SERIES



1 to 8 h.p., ratio 3:1. Wide V-Belts and Wide V-Belt Sheaves make this counter shaft unit available as complete drive.

"SELECT-O-SPEED" (not shown) for wide driven speed ranges. Fractional to 7 1/2 h.p. Also Wide V-Belt Sheaves, Wide V-Belts, and Adjustable Motor Bases. Deliveries from stock. Send for Catalog.

LOVEJOY FLEXIBLE COUPLING CO.
Mfrs. Lovejoy Flexible Couplings
5047 WEST LAKE STREET CHICAGO 44, ILLINOIS

"Sure we've got Wrought Iron Welding Fittings!"

WHEN you need wrought iron welding fittings *you really need 'em!* A good way of getting them is to get the Tube Turns distributor on the phone.

He handles the most complete line of welding fittings on the market, represents the one source of supply on which you can depend for all welding fitting requirements.

Tube-Turn wrought iron welding fittings are a standard part of the line as well as stainless steel, copper, aluminum, monel metal, inconel, nickel, carbon moly, chrome moly, brass. Tube-Turn welding fittings in these metals are available in all necessary weights, in a wide range of analyses, types, and sizes. The complete line of Tube-Turn welding fittings and flanges covers more than 4,000 items. Many of these are in stock with foresighted Tube Turns distributors, in every strategic industrial center, who built up a supply when this was still readily possible.

Write for the name of your nearest Tube Turns distributor and facts about how *the fittings that become part of the piping* serve others in your industry.

TUBE TURNS (Inc.) LOUISVILLE 1, KENTUCKY.
District Offices at New York, Washington, D.C., Philadelphia, Pittsburgh, Cleveland, Detroit, Chicago, Houston, San Francisco, Los Angeles.

TUBE-TURN TRADE MARK **tt** *Welding Fittings and Flanges*

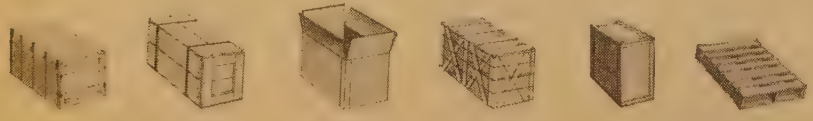
ONE SOURCE OF SUPPLY FOR ALL WELDING FITTING REQUIREMENTS

...by these *GOOD* names

you shall know us

These and hundreds of other users of shipping containers are numbered among our customers. Whatever the product may be—from pianos to precision parts—our 25 years' experience enables us to design containers that assure better protection, reduce shipping weight, and provide for increased production. Write today. We'll be glad to help you solve your packing problems. There's no obligation, of course.

Send for your copy of "The General Box." It's free—it's packed with facts of interest to you.



General All-Bound Box | *General Nailed Box* | *General Corrugated Box* | *General Wirebound Crate* | *General Cleated Corrugated Container* | *Generalift Pallet*

ENGINEERED SHIPPING CONTAINERS

25 YEARS YOUNG
1922 · 1947

General BOX COMPANY

GENERAL OFFICES: 506 N. Dearborn St., Chicago 10, Ill.

DISTRICT OFFICES AND PLANTS: Brooklyn, Cincinnati, Detroit, East St. Louis, Kansas City, Louisville, Milwaukee, New Orleans, Sheboygan, Winchendon, Natchez.

Continental Box Company, Inc.: Houston, Dallas.

25 years' experience in designing better containers for all industry.

Plant Equipment Previews

(Continued from page 192)

greater vertical range, an important feature in shops where a greater clearance between the cutter head and lowest position of table is required. The table can be nearly brought up to center line of spindle (horizontally).

FEBRUARY, 1947
PEP 54

ROUGH-SURFACE-FINISHED GLOVES

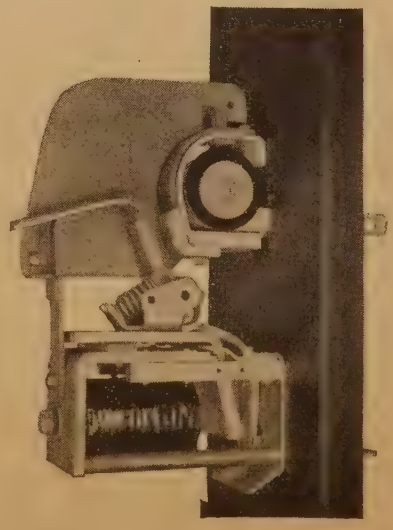
Selection Board's Opinion: Durable.

Manufacturer: Surety Rubber Co., Carrollton, Ohio.
Features: Permits a non-slip grip, even in liquids, for synthetic rubber gloves. The finish is an integral part of the glove and will not peel or wear off nor will loose particles break away while working in liquids. The gloves are available in all standard weights, sizes and styles.

FEBRUARY, 1947
PEP 55

HEAVY-DUTY MILL-TYPE CONTACTORS

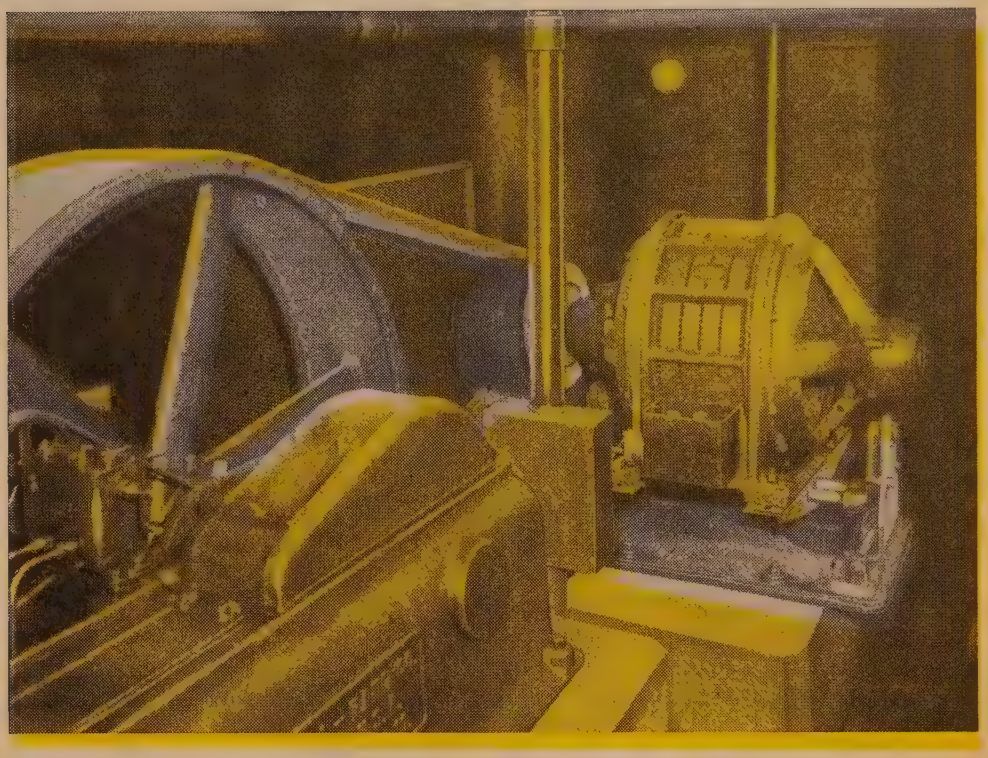
Selection Board's Opinion: Heavy duty design.



Manufacturer: General Electric Co., Schenectady 5, N. Y.
Features: Of DC mill type, these contactors

(Continued on page 196)

How much IS BELT SLIP COSTING You?



This is a typical installation of an American Econ-o-matic Drive operating on an air compressor. Since its installation in 1939 there has been no trouble with belts slipping or burning, and belt life is at least three times longer than that of former drive.

● Regardless of how efficient the valves, pistons and other working parts of an air compressor operate, it is impossible to get rated capacity from the unit unless it is driven at the *proper speed*. To get this proper speed means that not only the drive ratio will have to be right but *belt slip will have to be eliminated.*

Correct drive ratios can be easily computed. Belt slip can be easily eliminated by using American Econ-o-matic Drives.

American Econ-o-matic Drives eliminate belt slip because they automatically match the belt-tension to the load on the motor. When the load increases, the belts are automatically and instantly tightened to eliminate slip. When the load decreases, belt-tension is decreased—thus reducing wear on both belts and bearings.

Whether or not you operate compressors, Econ-o-matic Drives will give your flat or V-belt, short-center driven equipment the advantages of increased output, longer wear and reduced maintenance. Write today for more information on American Econ-o-matic Drives.

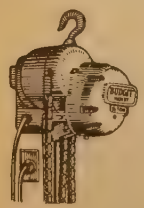
The American Pulley Company
4202 WISSAHICKON AVE., PHILADELPHIA 29, PA.

Men shouldn't lift...

No man should be expected to tug and strain with all his might to lift a heavy load — not even when lifting is only a part of his job!

Give him a 'Budgit' Electric Hoist to lift his heavy tools, the machine parts he makes, or the machines he helps assemble. You'll soon see how a 'Budgit' Hoist saves his strength, allows him to turn his energy into increased production with a resultant lowering of costs. You'll be free from lost man hours due to sprained backs, torn muscles, rupture! You'll be free from workers' compensations due to all such injuries.

You'll find 'Budgit' Electric Hoists easy to install — simply hang them up, plug into the nearest electric socket, and use! Each 'Budgit' Hoist is a complete lifting unit in itself. It starts lifting on a simple pull of the control cord. Operating costs are small — just a few cents a day.



'Budgit' Electric Hoists are made in sizes to lift 250, 500, 1000, 2000, and 4000 pounds. Write for Bulletin No. 371 for more detailed information.

MAXWELL MANNING & MOORE INC. TRADE MARK

'BUDGIT' *Hoists*

MANNING, MAXWELL & MOORE, INC.
MUSKEGON, MICHIGAN

Builders of 'Shaw-Box' Cranes, 'Budgit' and 'Load Lifter' Hoists and other lifting specialties. Makers of Ashcroft Gauges, Hancock Valves. Consolidated Safety and Relief Valves and 'American' industrial instruments.

Plant Equipment Previews

(Continued from page 194)

are designed for use in marine, steel mill and other heavy duty applications. Line contains nine contactors, all of similar construction and ranging from capacities of 100 to 2500 amperes. Two are of normally closed construction and the rest normally open. Can be serviced from front of panel without removing the contactor.

FEBRUARY, 1947
PEP 56

GRAPHIC INTERPRETATION OF RECORD DATA

Selection Board's Opinion: Flexible and easy to use.

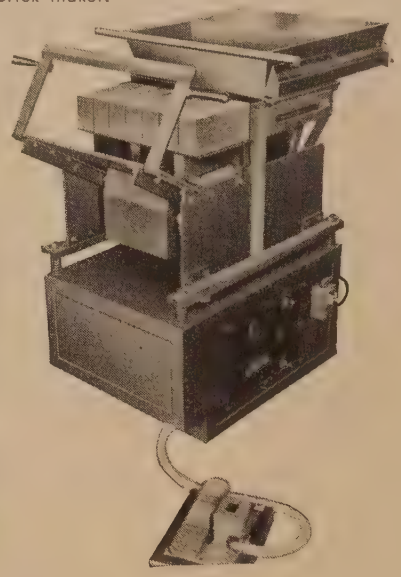
Manufacturer: Remington Rand Inc., 315 Fourth Ave., New York 10, N. Y.

Features: Embodies an ingenious and practical chart-board application of time control principles. Complete flexibility is achieved with a basically simple and easily operated system. Invaluable for executives interested in obtaining best utilization of man hours in production and of salesmen's efforts.

FEBRUARY, 1947
PEP 57

MACHINE FOR MAKING CONCRETE PRODUCTS

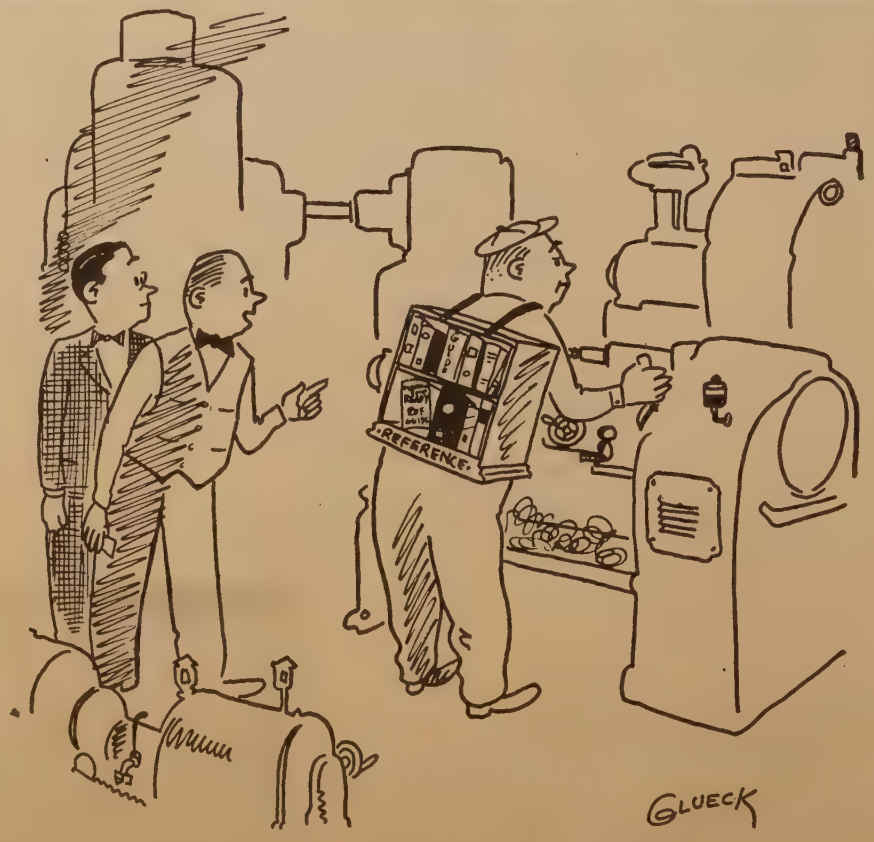
Selection Board's Opinion: High production brick maker.



Manufacturer: R. S. Reed Corp., 126 Hoffman St., Three Rivers, Mich.

Features: Bricks are molded on the low cost

(Continued on page 198)



"He keeps a few helpful volumes handy always—".

SPANG CW PIPE *is your* BEST BUY

because it's made in UNIFORM LENGTHS

MILE after mile of Spang C W Pipe is produced in uniform 21-foot lengths. Why? Because uniform lengths mean extra profit for you.

This convenient size requires less cutting and threading . . . fewer joints are needed . . . installation time is reduced . . . standard lengths are easier to handle and transport. These advantages save you money in time and material on every plumbing and heating job.

Spang C W Pipe has other uniform qualities that will help cut your costs. Its accurate diameter speeds threading and improves quality of threads. The smooth inside surface will increase customer satisfaction because it minimizes possibility of valve-clogging scale. The excellent workability of Spang C W permits it to be easily cut, bent, coiled or welded.

Put these profit-making advantages to work for you by using Spang C W Pipe. There's a Spang jobber near you who handles all standard sizes of this efficient pipe in black or galvanized finishes. Due to the accelerated demand, you may not be able to get all the Spang C W you want. But keep in touch with your jobber . . . he will make sure that you get a fair share of whatever he has.

SPANG-CHALFANT

Division of The National Supply Co.

EXECUTIVE OFFICES: PITTSBURGH, PA.

District Sales Offices: Atlanta; Boston; Chicago; Denver; Detroit; Houston; Los Angeles; New York; Philadelphia; Pittsburgh; St. Louis; San Francisco; Tulsa

Fast!
Lightweight!
Economical!

The
"FLORLINE"
MARKING MACHINE
THAT MAKES SAFETY AND PARKING LINES AT WALKING SPEED!

$89.50
F.O.B. Detroit

- One man . . . one hand operation
- Easy to use . . . easy to clean
- Pays for itself quickly
- Portable . . Compact . . Durable
- Curved or straight lines

USED BY FACTORIES, AUTO DEALERS, PARKING LOTS, ON HIGHWAYS, ETC.

Dealerships available some areas

H.C. SWEET COMPANY
3729 FENKELL AVENUE
DETROIT 21, MICH.

Plant Equipment Previews

(Continued from page 196)

plain pallets of wood or steel. Upon completion of the vibration and molding of the brick they are instantly removed from the machine on the pallets for curing. Concrete brick made on this machine will have compressive strengths up to 100% greater than those of a given mix by other methods.

FEBRUARY, 1947
PEP 58

EMULSIFYING AGENT

Selection Board's Opinion: Many possible cleaning uses.

Manufacturer: Turco Products, Inc., 6135 S. Central Ave., Los Angeles 1, Cal.
Features: Removes heavy deposits of oil and light grease from all kinds of metal parts and equipment. In solution with petroleum cleaning agents, it adds to the cleaning potency of these agents through its deep penetrating qualities and, because of its high flash point (180 degrees F.) greatly increases the margin of safety for the operator.

FEBRUARY, 1947
PEP 59

INFRA-RED LAMP PORTABLE HEATER

Selection Board's Opinion: Portability a good feature.

Manufacturer: Duro Test Corp., North Bergen, N. J.
Features: Equipped with 250 watt natural infra red lamps this heater is designed to

(Continued on page 200)

THERE CAN BE NO SUBSTITUTE FOR ACCURACY!

Accuracy is the foundation of our entire production system. The great American miracle—the mass production of millions of products—has been accomplished through the precision production of parts and pieces so accurate that they are instantly interchangeable. Accuracy is an essential feature without which mass production would be wholly unknown.

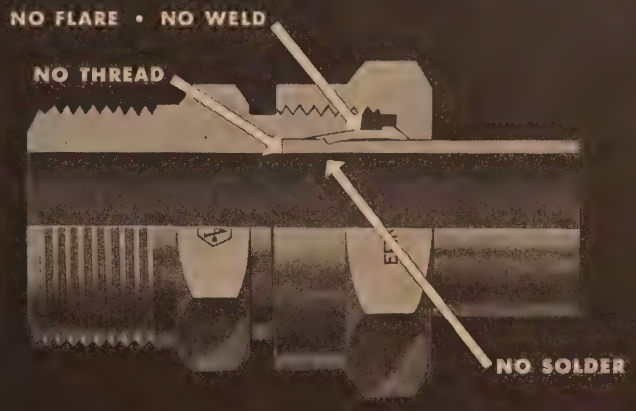
Built-in *accuracy* makes South Bend the favored lathe in the toolroom, production line, and maintenance departments of industries large and small. It is this famed South Bend precision *plus* other features — versatility, operating ease, rugged construction — that you get when you replace outmoded equipment with modern South Bend Precision Lathes.

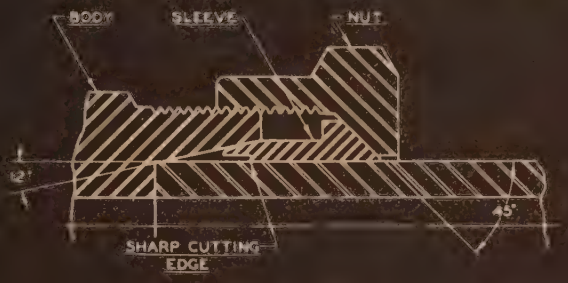
SOUTH BEND LATHE WORKS
Lathe Builders Since 1906
518 E. Madison Street, South Bend 22, Indiana

This New Catalog *FREE!*
Write for Catalog 100-D. It shows all types and sizes of South Bend Precision Lathes.

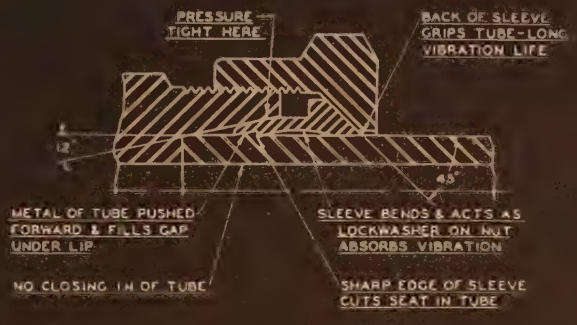
South Bend LATHES

No Other Fitting has this





Tube Inserted in Fitting — Nut and Sleeve Snug


PRESSURE TIGHT HERE
BACK OF SLEEVE GRIPS TUBE-LONG VIBRATION LIFE
45°
METAL OF TUBE PUSHED FORWARD & FILLS GAP UNDER LIP
SLEEVE BENDS & ACTS AS LOCKWASHER ON NUT ABSORBS VIBRATION
NO CLOSING IN OF TUBE
SHARP EDGE OF SLEEVE CUTS SEAT IN TUBE

Nut Tightened In Place

Exclusive Design

MORE and more Contractors and Manufacturers are learning *to their profit*, the benefits of Weatherhead Ermeto Fittings. They solve the mechanical problem of connecting tubing without the necessity of flaring, threading, welding or soldering. This is truly a time-saving fitting.

Connections are quickly made which will, in most instances, hold beyond the burst strength of the tube itself and withstand excessive vibration without loosening the joint.

There is a size and type of Ermeto fitting for practically every application. Can be furnished in O. D. tube sizes from ⅛" to 2" inclusive. Special sizes are available to meet your individual requirements.

Look Ahead with

Weatherhead

THE WEATHERHEAD COMPANY, CLEVELAND 8, OHIO

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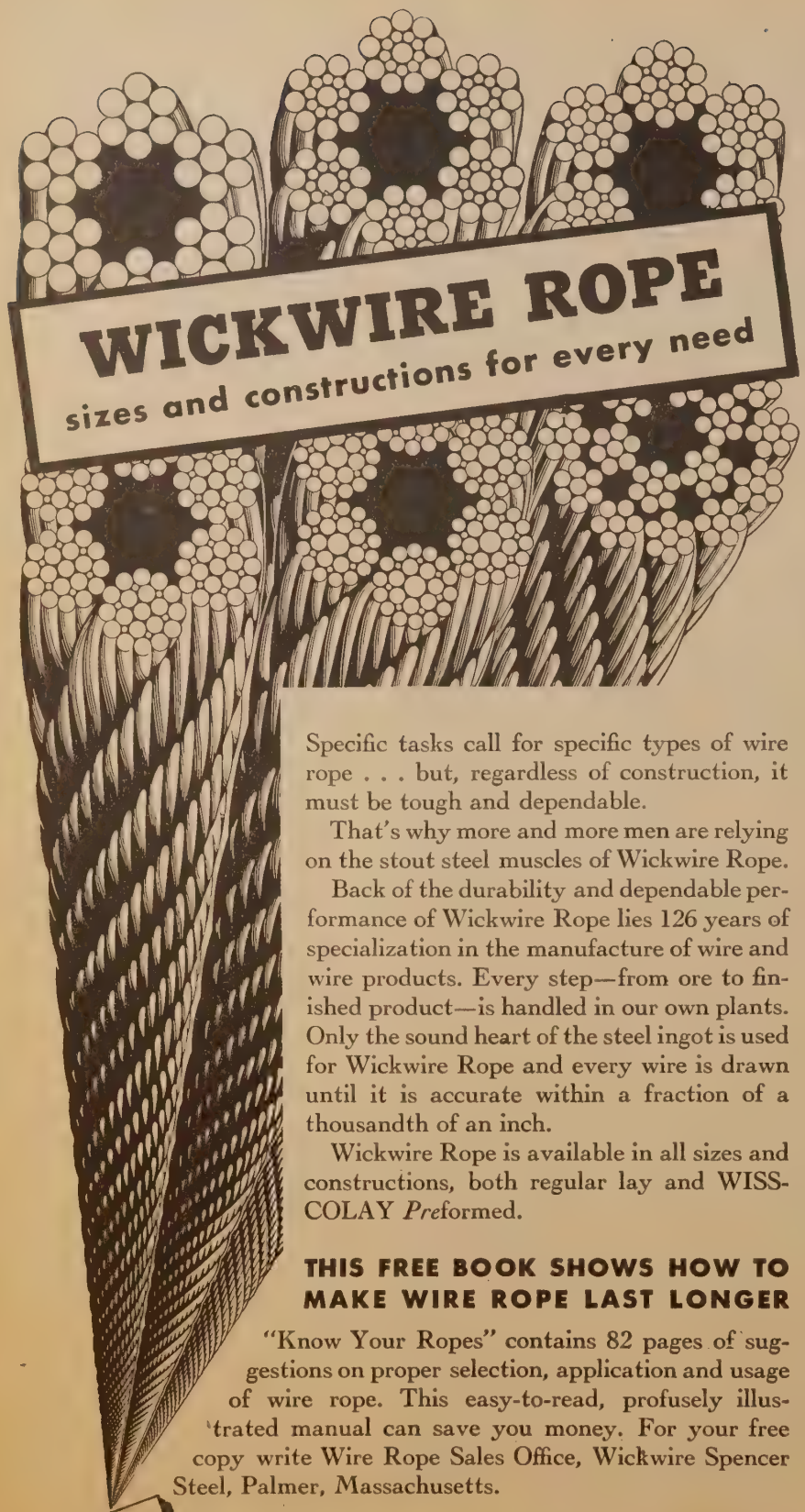
FREE!

Write today for the fully illustrated Ermeto Catalog and learn how Weatherhead Ermeto fittings can provide dependable connections for hydraulic, air, water or oil lines.

Your nearest Weatherhead office will be glad to consult with you and provide any technical literature.



Specific tasks call for specific types of wire rope . . . but, regardless of construction, it must be tough and dependable.

That's why more and more men are relying on the stout steel muscles of Wickwire Rope.

Back of the durability and dependable performance of Wickwire Rope lies 126 years of specialization in the manufacture of wire and wire products. Every step—from ore to finished product—is handled in our own plants. Only the sound heart of the steel ingot is used for Wickwire Rope and every wire is drawn until it is accurate within a fraction of a thousandth of an inch.

Wickwire Rope is available in all sizes and constructions, both regular lay and WISS-COLAY *Pre*formed.

THIS FREE BOOK SHOWS HOW TO MAKE WIRE ROPE LAST LONGER

"Know Your Ropes" contains 82 pages of suggestions on proper selection, application and usage of wire rope. This easy-to-read, profusely illustrated manual can save you money. For your free copy write Wire Rope Sales Office, Wickwire Spencer Steel, Palmer, Massachusetts.

WICKWIRE ROPE

A PRODUCT OF WICKWIRE SPENCER STEEL DIVISION OF THE COLORADO FUEL AND IRON CORPORATION

WIRE ROPE SALES OFFICE AND PLANT—Palmer, Mass.
GENERAL OFFICE—361 Delaware Ave., Buffalo 2, N. Y.
SALES OFFICES—Abilene (Tex.) • Boston • Chattanooga Chicago • Denver • Detroit • Philadelphia • Tulsa Ft. Worth • Houston • Newport News • New York
PACIFIC COAST:—The California Wire Cloth Corp., Oakland 6, Cal.

CF&I

Plant Equipment Previews

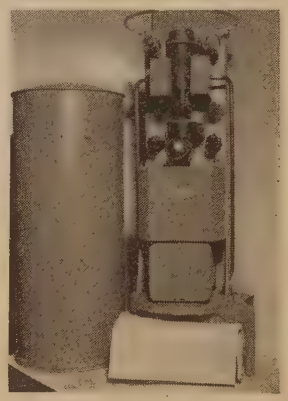
(Continued from page 198)

meet hundreds of needs commercially and industrially in factories, stores, offices, filling stations, etc. Can be of service wherever instant heat is required such as in drying paints and enamels, dehydrating aqueous solutions, quick heating of garages, tourist cabins, etc.

FEBRUARY, 1947
PEP 60

STRAY CURRENT CONTROL SYSTEM

Selection Board's Opinion: Prevents damage due to electrolytic action.

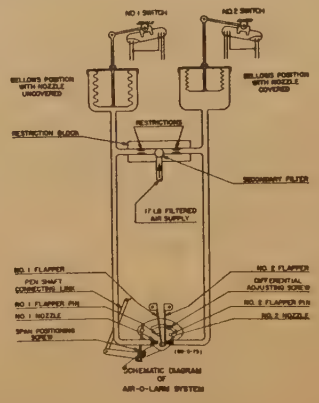


Manufacturer: Cook Research Laboratories, Chicago, Ill.
Features: A current and voltage sensitive device. When stray current tends to leave the pipe, the contactor will close, thereby contacting the rail and pipe with a solid metallic bond on which the current may travel harmlessly rather than by damaging electrolytic action through the soil. Conversely contactor opens instantaneously when current flows in opposite direction, preventing system from becoming a backpath for more stray current.

FEBRUARY, 1947
PEP 61

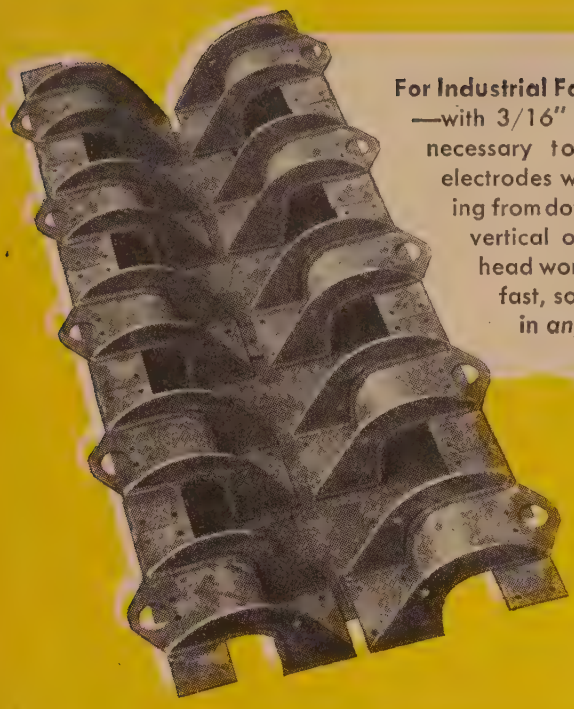
INDUSTRIAL ALARM SYSTEM

Selection Board's Opinion: Many good features.



Manufacturer: Brown Instrument Co., Philadelphia, Pa.
Features: A pneumatically operated mercury switch assembly provides explosion proof alarm systems under hazardous con-

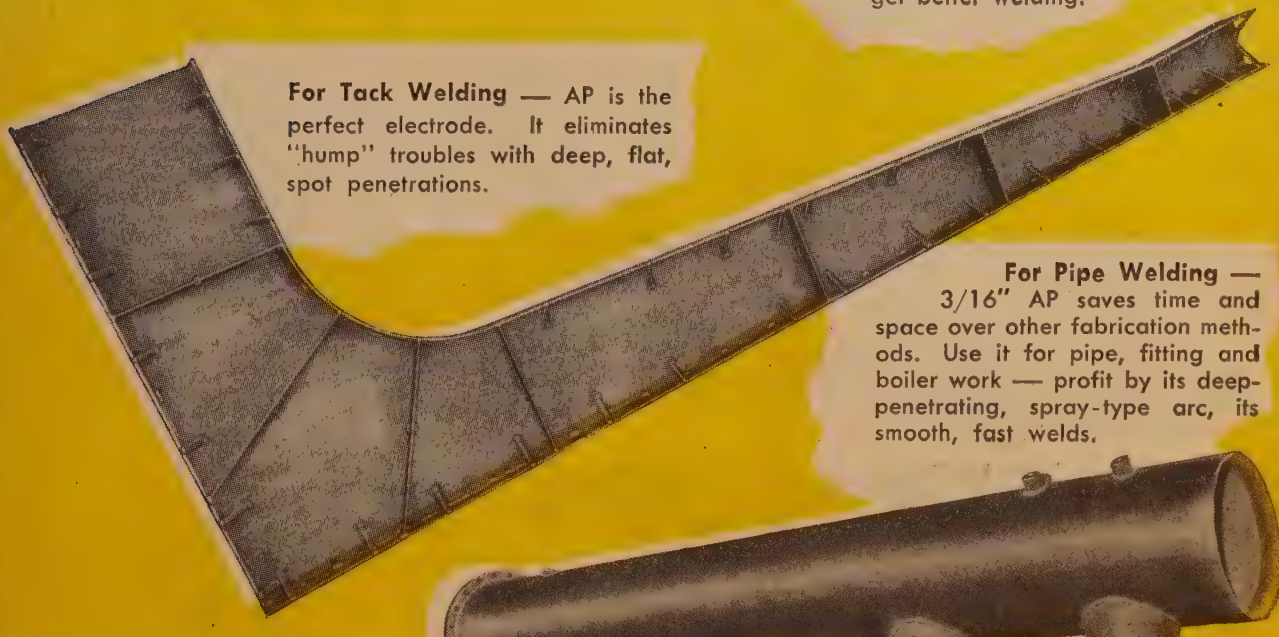
(Continued on page 204)



For Industrial Fabrication —with 3/16" AP it isn't necessary to change electrodes when welding from downhand to vertical or to overhead work. You get fast, sound welds in *any* position.

On Construction Work — AP, in this one size, welds in all-positions. It means far fewer electrode changes . . . fewer danger-making moves. You can weld faster, and get better welding.

For Tack Welding — AP is the perfect electrode. It eliminates "hump" troubles with deep, flat, spot penetrations.



For Pipe Welding — 3/16" AP saves time and space over other fabrication methods. Use it for pipe, fitting and boiler work — profit by its deep-penetrating, spray-type arc, its smooth, fast welds.

Your P&H REPRESENTATIVE has AP

P&H makes a production-proved electrode for every welding requirement: for all mild, alloy and stainless steel applications, cast iron and for building up and hard surfacing.

P&H WELDING ELECTRODES

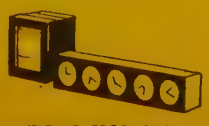
4565 W. National Avenue, Milwaukee 14, Wis.

HARNISCHFEGER CORPORATION

ARC WELDERS · EXCAVATORS · ELECTRIC CRANES · P&H · MOTORS · HOISTS · WELDING ELECTRODES

AMERICA'S MOST COMPLETE ARC WELDING SERVICE.

WELDING POSITIONERS



WELDING PRODUCTION CONTROL SYSTEMS

ELECTRIC HOISTS

DC WELDERS

AC WELDERS

WELDING ELECTRODES

A Point of Satisfaction

COMPRESSORS

A field trial winner is to the hunter what a highly successful and widely used piece of machinery is to the owner . . . a point of satisfaction.

With Ingersoll-Rand Type 30 Compressors you are assured of a reliable supply of air. A supply that can be depended upon with a minimum of maintenance care.

I-R Compressors daily deliver the needed air to thousands of factories the world over. Sizes range from ½ to 10 hp delivering 5 to 3500 pounds pressure.

Ask your industrial dealer or the nearest I-R branch office for complete details.

Ingersoll-Rand

11 Broadway, New York 4, N. Y. 3-859

Plant Equipment Previews

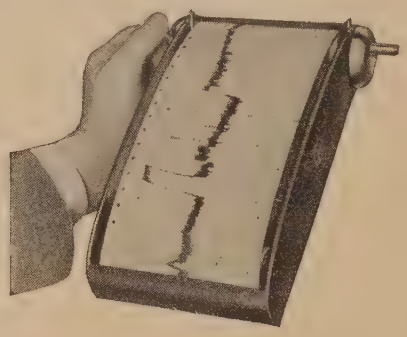
(Continued from page 200)

ditions at pre-determined values of flow, liquid level, temperature or pressure. The auxiliary switch contacts can be wired to provide visual or audible readings, or both, on any installation with 1 or 2-pen recorders, indicators, and controllers.

FEBRUARY, 1947
PEP 62

CHART VIEWER

Selection Board's Opinion: Simplifies the checking of recording charts.



Manufacturer: General Electric Co., Schenectady 5, N. Y.

Features: Simplifies the inspection of strip chart records. Available in 2 models: one for use with 4⅜" wide record roll and the other for 4" wide roll. Operation is simple as record roll to be viewed is placed in a trough at one end of the viewer, and the free end of the paper is wound onto the spool of the other end by hand operation of a crank.

FEBRUARY, 1947
PEP 63

MAGNET CHAIN

Selection Board's Opinion: Does not gouge or kink.

Manufacturer: The S. G. Taylor Co., Hammond, Ind.

Features: Delivers three times as much life as conventional magnet chains in use. Incorporates a 60-degree twist in two of the three connecting links, which serves to keep the links of the legs perpendicular to each other. This reduces to a minimum wear caused by gouging or kinking.

(Continued on page 206)

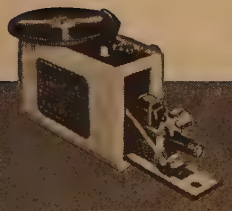
NO "HOT-FOOT" HERE

OIC

SETS THE PACE IN VALVES

MANY a steel valve has been quickly ruined by high-temperature fluids or gases near the foot of the stuffing-box. Heat can literally "bake" the packing to the stem and the stuffing box . . . causing galling and seizing. Now OIC valve designers have solved this problem by lifting the foot of the stuffing box farther away from the hot valve body . . . to keep the packing cool and in good condition.

As you can see in the picture above, this efficient, new OIC steel valve design is as simple as A, B, C. Packing is separated from the hot valve body by a heavy, alloy-steel ring bushing (A) . . . a condensing chamber (B) . . . and a pressure-tight back-seat bushing (C). The packing stays cool . . . stays on the job to assure you long, economical, trouble-free valve service.



See new film

For latest information on steel valves, see the new OIC sound slidefilm. If you'd like a "showing" for your personnel, please mail reservation request now to The Ohio Injector Company—Wadsworth, Ohio.

OIC VALVES

STEEL - IRON - BRONZE

O-147-8

PRECISION BRAND

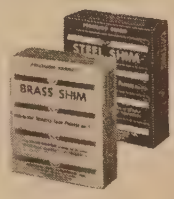
SHIM and THICKNESS GAUGE STOCK

Prepared for your Convenience

SAVES TIME • WASTE • BOTHER

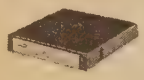
SHIM STOCK
Brass or Steel
Single rolls 6"x100" each, 600 sq. inches to the carton. All popular thicknesses. Cellophane wrapped—moisture-proof.

ASSORTED SHIM STOCK
Brass — Steel
Contains an assortment in most popular sizes of Precision Brand Shim Stock. 4 separate thicknesses 6x50" each. Total 1200 square inches. Put up in easel type display dispensers cellophane wrapped.

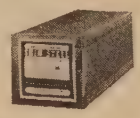


THICKNESS GAUGE STOCK
Precision Brand Quality—tempered, polished and edged with rounded ends—size and brand etched on each piece. This comes in 12 inch lengths in individual envelopes. 12 to the box and 9 popular thicknesses to the carton.

SHIM PACKETS
Brass or Steel
Flat Stock — Total 6 Pieces. Each 3⅜"x6"—120 sq. inches. 2 pieces each .001, .002, .003. 48 packets to the box.



THICKNESS GAUGE STOCK
½" Wide
Precision Brand thickness or feeler gauge stock is manufactured from tempered and polished clock spring steel, specially for this purpose. It comes in dispensers—cellophane wrapper for moisture protection—and in 10 ft., 15 ft. and 25 ft. lengths. All popular thicknesses.



SHIM STEEL
Heavy Sizes
6"x100" and 12"x120" in 200 pound test corrugated paper cartons. Thicknesses up to .031". Complete range.

We now carry a complete stock of Drill Rods.

WRITE FOR FULL INFORMATION

PACKAGE GOODS DIVISION

*Reg. U.S. Pat. Off

PRECISION STEEL WAREHOUSE, INCORPORATED

4425 WEST KINZIE STREET CHICAGO 24, ILLINOIS

Plant Equipment Previews

(Continued from page 204)

FEBRUARY, 1947
PEP 64

INDOOR CURRENT TRANSFORMER

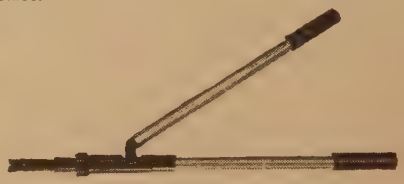
Selection Board's Opinion: High capacity.

Manufacturer: General Electric Co., Schenectady 5, N. Y.
Features: A 1200 volt indoor current transformer for metering service on 3-wire, single-phase indoor circuits. Is available in primary current ratings of 10//10 to 400//400 amperes and has been assigned a 30-kv full-wave rating. Spacing between primary terminals is 1½".

FEBRUARY, 1947
PEP 65

RIVET HAND GUN

Selection Board's Opinion: Handles large sizes.

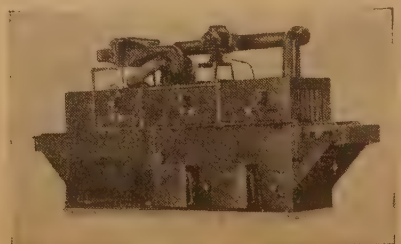


Manufacturer: Cherry Rivet Co., 231 Winston St., Los Angeles 13, Cal.
Features: Designed for small-quantity users of the larger sizes (7/32", ¼" and 9/32") of blind rivets but with an adapter can also install the smaller rivets. This hand gun operates on the ratchet principle and is lightweight and easy to handle. Measures 29" long with pulling head; weighs 4½ lbs.

FEBRUARY, 1947
PEP 66

FLAT CONVEYOR SPRAY WASHER

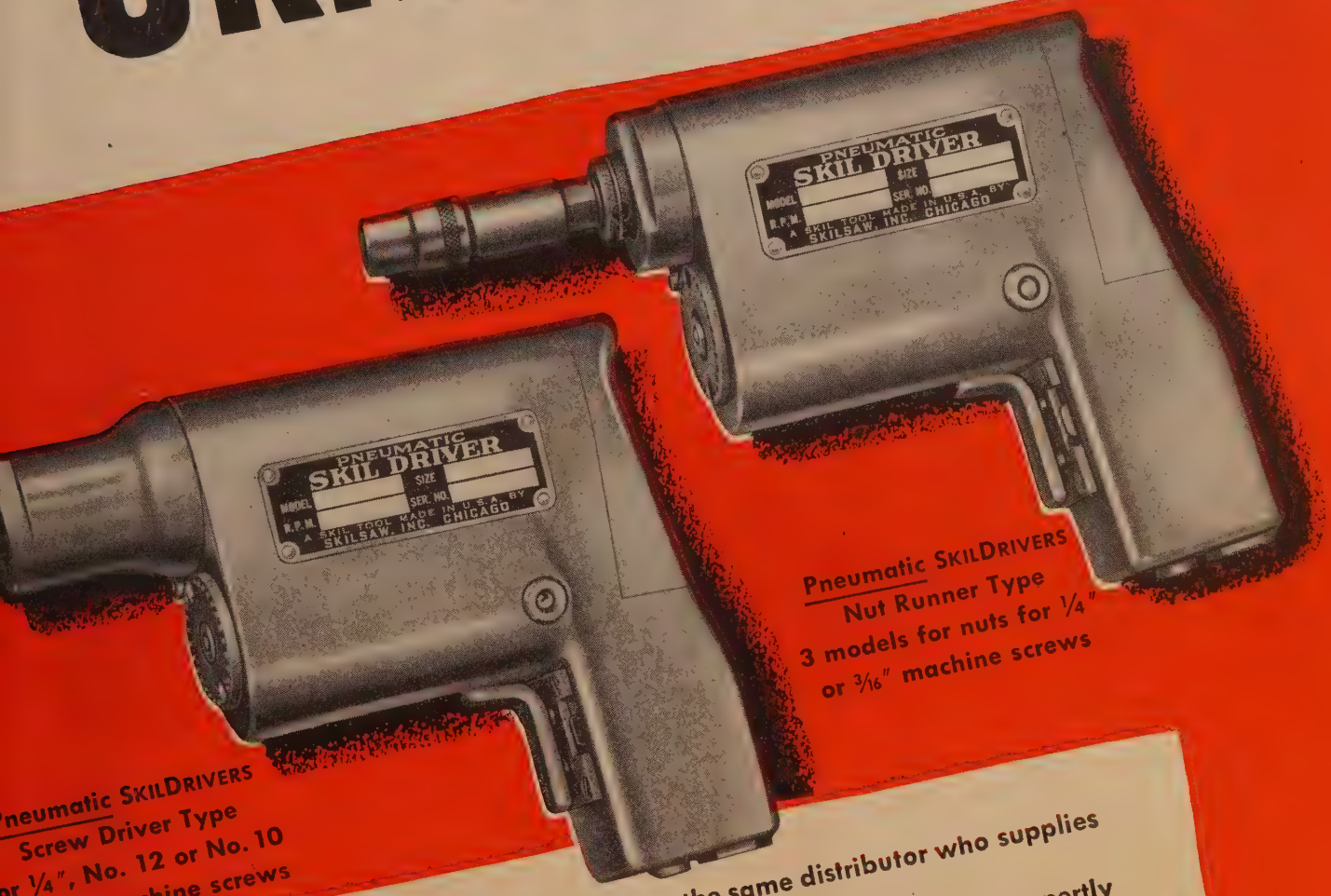
Selection Board's Opinion: High production unit.



Manufacturer: Optimus Equipment Co., 217 Church St., Matawan, N. J.
Features: The machine will rapidly spray

(Continued on page 210)

SKILTOOLS"



Pneumatic SKILDRIVERS
Nut Runner Type
3 models for nuts for 1/4"
or 3/16" machine screws

Pneumatic SKILDRIVERS
Screw Driver Type
or 1/4", No. 12 or No. 10
wood or machine screws

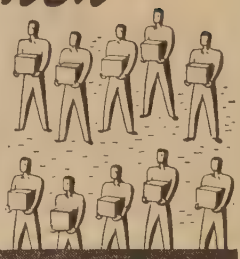
ou can get these advanced Pneumatic SKILTOOLS from the same distributor who supplies you with Electric SKILTOOLS. Like the Electric SKILTOOLS, Pneumatic SKILTOOLS are expertly designed on tested engineering principles, and made from the finest materials available. This is in line with our determination to build not the most tools . . . just the best!

SKILSAW, INC.
5033 Elston Avenue, Chicago 30, Illinois
Factory Branches in Principal Cities

ELECTRIC PNEUMATIC
SKILTOOLS

MADE BY SKILSAW, INC.

These 2 men



do the work of 10

with STEVEDORE, Jr.

Two men, one loading and one unloading, assisted by a Stevedore, Jr., will lift and carry more goods than ten men can unaided. Stevedore, Jr. uses strong, untiring machine power to perform this heavy task faster and more economically than the strongest men could.

Stevedore, Jr. is a power driven endless belt conveyor on an adjustable base. Stacks up to 6 feet at any angle. Portable — easily moved around. Plugs in any light socket. Carries up to 200 pounds of distributed load at 65 feet per minute. Used for stacking . . . loading and unloading . . . as a pusher in a gravity conveyor line . . . and for many other purposes.

Our free bulletin will bring you complete details on how Stevedore, Jr. can reduce your lifting and stacking costs. Send for it right now.

OFFICES IN PRINCIPAL CITIES

Manufacturers of

STEEL FORGED CASTERS - TRUCKS - CONVEYORS - POWER BOOSTERS

The Rapids-Standard Co., Inc.

Sales Division—375 Peoples National Bank Bldg., Grand Rapids 2, Michigan

Plant Equipment Previews

(Continued from page 206)

any parts which may be handled either in baskets, on racks or simply laid on the conveyor. Alkaline, acid, solvent type, air drying, oil spray and many similar operations can be handled. Any type of heating can be employed and machine is available with any variety of horizontal conveyor.

FEBRUARY, 1947
PEP 67

THERMOSTAT FOR QUICK BATTERY CHARGERS

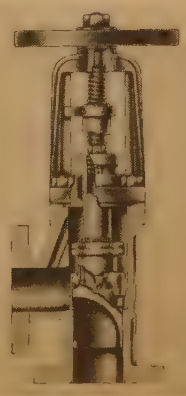
Selection Board's Opinion: Prevents battery overheating.

Manufacturer: United Electric Controls Co., 71 A Street, S. Boston, Mass.
Features: Designed for very close temperature control on quick battery chargers where the slightest overheating will ruin a battery. Also applicable for controlling the temperature of strong liquids, gasses and hot plates. Has an electrical rating of 1000 watts, 110 volts AC, non-inductive. The on-off differential is 3 degrees; control is adjustable within 0 to 250 degrees F.

FEBRUARY, 1947
PEP 68

SEATLESS BLOW-DOWN VALVE

Selection Board's Opinion: Requires less maintenance.



Manufacturer: Associated Valve & Engr. Co., 1150 W. Marquette Road, Chicago 21, Ill.
Features: Long life assured by 3 factors: (1) Seatless construction eliminates wear

(Continued on page 212)

A Purchasing Agent Writes a Norton Advertisement on 32 ALUNDUM*

Norton Company
Worcester 6
Massachusetts

Gentlemen:

We have recently run some tests with Norton's new 32 ALUNDUM Grinding Wheels and the results obtained were so far ahead of anything we have ever used that it is recommended that the Norton Company send one of their representatives here to make a survey and suggest the proper 32 ALUNDUM Wheel specifications for our surface, tool, and internal grinding operations.

In our judgment these new grinding wheels cut faster, require fewer dressings, and last longer than the wheels we are now using for the majority of our grinding operations.

Therefore, we suggest the above recommended survey and change to this new wheel wherever advisable as soon as possible, keeping in mind the depletion of our present stock so as not to have a quantity of old wheels on hand after the change over.

Very truly yours,

(A Prominent Textile Machinery Manufacturer)

Purchasing Agent

NORTON ABRASIVES

*T. M. Reg. U. S. Pat. Off.

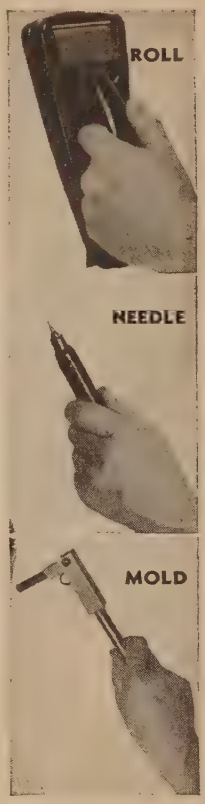
Surface

PYROMETERS

for every purpose

The routine use of CAMBRIDGE Surface Pyrometers takes the guesswork out of temperature determination in many industries. The CAMBRIDGE is accurate, dependable, rugged, quick-acting and easy to use. The Roll Model is for checking surface temperatures of still or moving rolls. The Needle Model is for insertion into materials in a plastic or semi-plastic state for within-the-mass temperature determination. The Mold Model is for checking surface temperatures of mold cavities and surfaces of almost any contour.

Send for Bulletin 194SA



CAMBRIDGE INSTRUMENT COMPANY, INC.
3747 Grand Central Terminal New York 17, N. Y.

CAMBRIDGE
PIONEER MANUFACTURERS OF
PRECISION INSTRUMENTS

Moisture Indicators and Recorders • Physical Testing Instruments
Surface Pyrometers • Laboratory Instruments for A. C. & D. C. • Galvanometers
Engineering Instruments • Gas Analysis Equipment • Physiological Instruments
and many other Mechanical and Electrical Instruments

SAFE • ECONOMICAL

K&K

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CLEANS BOILERS

Conditions Water & Steam
Removes—Prevents
Rust—Scale & Emulsions

Non-corrosive—Non-caustic
Guaranteed harmless.
Blow off under pressure.
No drain—No flush
No shut-down

One of KENITE'S Time-tested, Safe Chemical Heating Specialties. By makers of Kenbric Soot Remover. Ask your supplier or write us. Immediate Deliveries.

DISTRIBUTORS: Territories open. Attractive basis. Write TODAY.

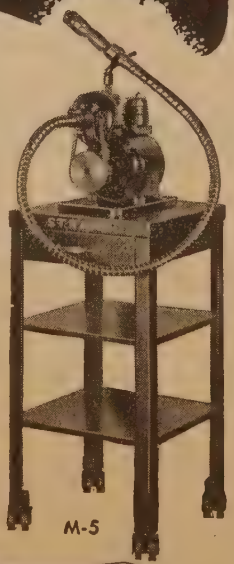
KENITE LABORATORY, INC.
83 MURRAY ST. NEW YORK 7, N. Y.

when you want Speed—
when you want power—

. . . in your job of grinding, polishing, buffing, sanding, drilling, reaming, screw-driving or nut-setting, you want a Strand Flexible Shaft machine, because a Strand will do it faster, better, and stand up to it longer.

Strand Flexible Shaft machines provide constant speeds with greater operator convenience. Hundreds of attachments easily interchanged—125 types and sizes—models include vertical and horizontal type machines from ⅛ to 3 h.p. Distributors in all principal cities.

Send today for catalog showing complete line



Strand
FLEXIBLE SHAFTS
N. A. STRAND & CO.
5013 NO. WOLCOTT AVE. CHICAGO 40, ILL.

Plant Equipment Previews

Continued from page 210)

caused on a seat by erosive action of hot water containing abrasives; (2) the packing shield protects packing from abrasive action of flow through the valve; (3) wear on 1-piece piston is minimized by directional flow of the boiler blow-down.

FEBRUARY, 1947
PEP 69

EXPENDABLE CARTRIDGE FILTERS

Selection Board's Opinion: Replaceable units.

Manufacturer: Bowser Inc., Fort Wayne, Ind.

Features: The filter contains replaceable resin-impregnated, cellulose elements which remove particles as small as 1 micron (.000039") from liquids with viscosities up to 600 S.S.U. and temperatures as high as 350 degrees F. The cellulose cartridges are completely neutral, containing no chemical bleach to affect color of the filtered liquid.

FEBRUARY, 1947
PEP 70

ACCESSORY FOR INDUCTION HEATING

Selection Board's Opinion: Useful where parts to be heated must be rotated.

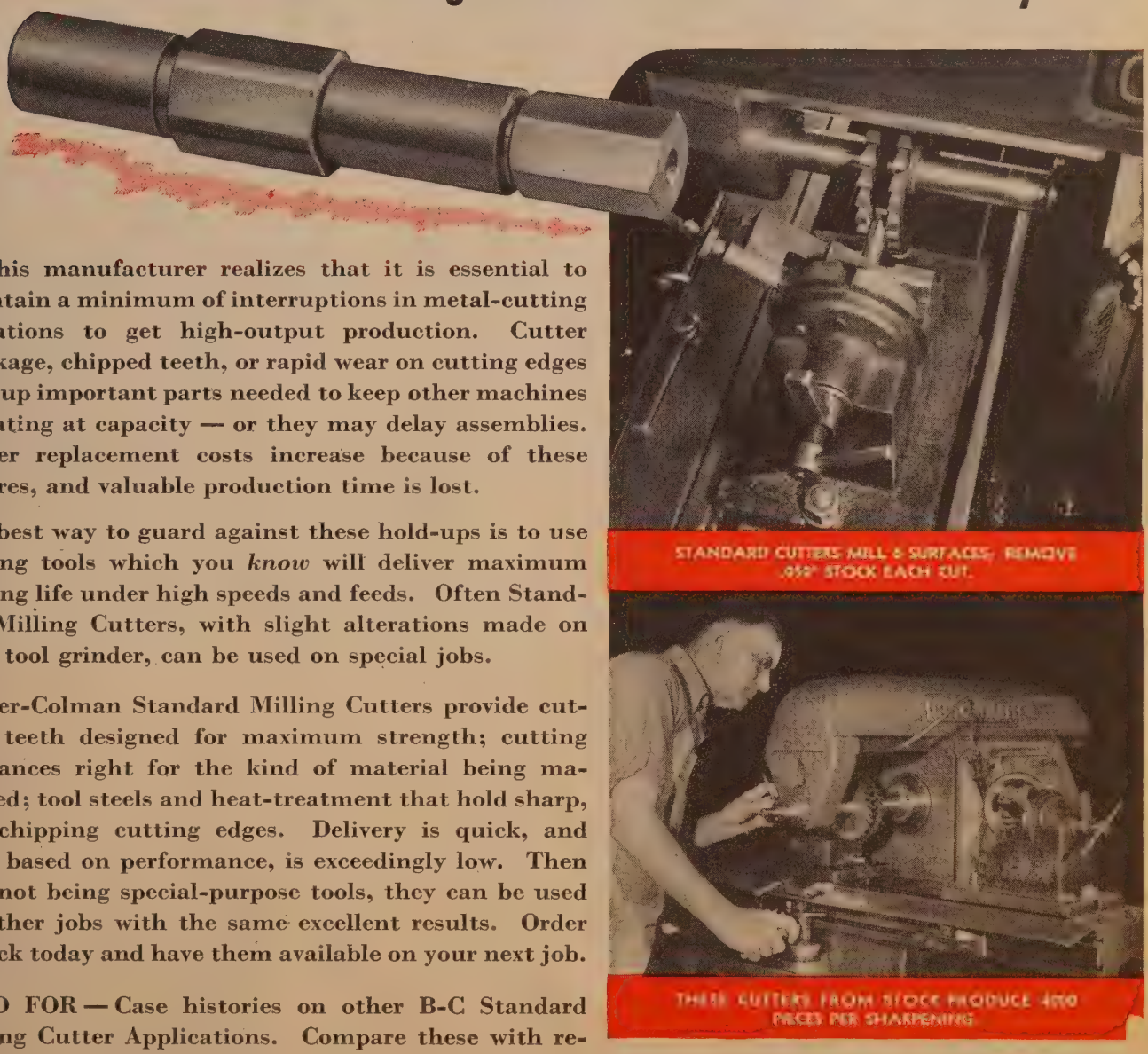
Manufacturer: Induction Heating Corp., 389 Lafayette St., New York 3, N. Y.
Features: A compact, hydraulic rotary spindle and quench ring, combined in a single unit, for use with any type of in-

(Continued on page 214)

HOW ONE MANUFACTURER SOLVES

TOOL REPLACEMENT COSTS!

Use of Standard Milling Cutters Saves Time and Money


STANDARD CUTTERS MILL 6 SURFACES, REMOVE .059" STOCK EACH CUT.
THESE CUTTERS FROM STOCK PRODUCE 4000 PIECES PER SHARPENING

● This manufacturer realizes that it is essential to maintain a minimum of interruptions in metal-cutting operations to get high-output production. Cutter breakage, chipped teeth, or rapid wear on cutting edges hold up important parts needed to keep other machines operating at capacity — or they may delay assemblies. Cutter replacement costs increase because of these failures, and valuable production time is lost.

The best way to guard against these hold-ups is to use cutting tools which you *know* will deliver maximum cutting life under high speeds and feeds. Often Standard Milling Cutters, with slight alterations made on your tool grinder, can be used on special jobs.

Barber-Colman Standard Milling Cutters provide cutting teeth designed for maximum strength; cutting clearances right for the kind of material being machined; tool steels and heat-treatment that hold sharp, non-chipping cutting edges. Delivery is quick, and cost, based on performance, is exceedingly low. Then too, not being special-purpose tools, they can be used on other jobs with the same excellent results. Order a stock today and have them available on your next job.

SEND FOR — Case histories on other B-C Standard Milling Cutter Applications. Compare these with results you are now getting. Ask for Bulletin DM-247.

MODERN MACHINES WITH ORDINARY BARBER B-C COLMAN CUTTING TOOLS ARE NOT FULLY EFFICIENT

ABOUT THIS JOB

These B-C Standard Side Mills, 6″ dia. x ½″ face, were adapted to this production job of milling hex flats on a spindle arm shaft of SAE 4615 Steel, Rockwell 20C. Production results were as follows:

Operation — Gang of two cutters mills hex flats in special centering fixture; fixture has 3-station indexing device; flats .500″ x 25/32″.

Feed — 5⅝″ I.P.M. Speed — 135 S.F.M.

Cutting Time — 1 complete shaft every 48 seconds.

Tool Life — 4000 pieces per gang sharpening

Accuracy — Hex surfaces true within .0035″ Allowable distortion of flats in relation to each other, 3/64″ in 6″ lgth.

Barber-Colman Company

GENERAL OFFICES AND PLANT 101 LOOMIS ST. ROCKFORD, ILLINOIS U.S.A.

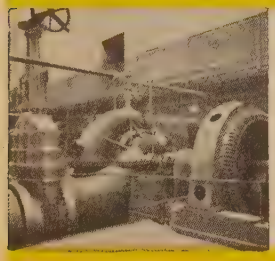
INDUSTRY BANS RUST AND CORROSION with Everlasting Fastenings

Few industries can escape the destructive effects of rust and corrosion but *all* industries can reduce their costly ravages in maintenance and breakdown.

Here are five industrial applications where Harper's EVERLASTING FASTENINGS have licked rust and corrosion.

MONEL STOPS CORROSIVE CHEMICALS

Problems in salt production have been solved by using Monel bolts. In mining, treating and handling of many chemicals, non-ferrous alloys are the answer to efficient operation.

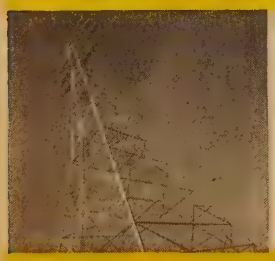


BRASS GUARDS WATER SYSTEMS

In valves and pumps that compose the heart of water works, Brass fastenings help in eliminating the most common cause of replacement—rust.

STAINLESS STEEL SOLVES OIL PROBLEMS

Acids and gases at high temperatures attack metal but Stainless Steel alloys cut refinery replacements to a minimum, assure years of continued operation.



UTILITIES CHOOSE SILICON BRONZE

Weather is the bug-a-boo in power lines and other utility applications. Silicon Bronze Bolts reduce season "cracking" and maintenance costs.

NAVAL BRONZE WINS ON SEA

Marine applications demand high strength plus resistance to salt air and water. Naval Bronze fastenings have proved their dependability in marine diesels and ship fittings.

Call upon Harper to solve your fastening problems in your industry.

THE H. M. HARPER COMPANY
2617 Fletcher Street, Chicago 18, Ill.
Branch Offices: New York City, Philadelphia, Los Angeles, Milwaukee, Cincinnati, Dallas
Representatives in Principal Cities

HARPER
Everlasting Fastenings
Chicago

Plant Equipment Previews

(Continued from page 212)

duction heating equipment. Simplifies the handling and heat treating of parts requiring rotation during the heating cycle. Speed of rotation is controlled by varying the water flow.

FEBRUARY, 1947
PEP 71

SOLDERING IRON

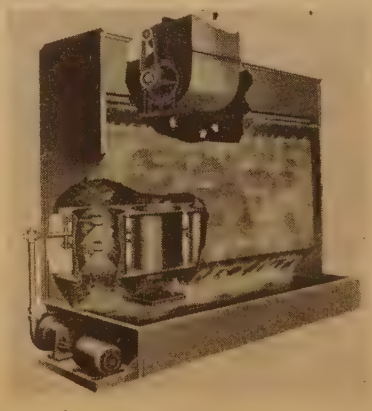
Selection Board's Opinion: Efficient but economical in power.

Manufacturer: General Electric Co., Schenectady, N. Y.
Features: Rated 85 watts, 115 volts, the soldering iron contains the cartridge-type Calrod heater. The half inch copper tip is brazed onto the iron, assuring fast heat conductivity and more soldering with less power.

FEBRUARY, 1947
PEP 72

WATER TUBE SPRAY BOOTH

Selection Board's Opinion: Knock-down portable features are good.



Manufacturer: Newcomb-Detroit Co., 5741 Russell St., Detroit 11, Mich.
Features: A complete unit and 90% preassembled when delivered. The booth is a water curtain type and incorporates the use of a series of tubes to clean the paint-laden air. Inside each tube are 2 high velocity, clog-proof nozzles which wash the air twice. This is then drawn through moisture separators and discharged. Available in 5 sizes from 5,000 to 15,000 C.F.M.

(Continued on page 216)

When every minute counts!

Call on this man! He's your Industrial Supply Specialist. He's on call night and day to help you avoid costly delays.

For example, he knows the kind of hose you need to keep air drills and heavy-duty compressors on the job.

That's why your Industrial Supply Specialist will recommend Monarch Air Hose. It's "Job-Engineered" by Hewitt to resist abuse . . . to last longer.

Even where hot oil conditions are unusually severe, Monarch Air Hose stays right on the job. That's because its tube is made of oil- and heat-resisting compounds that will neither swell nor flake.

More than that, Monarch's special braided construction eliminates kinking . . . insures high burst-resistance.

When your Industrial Supply Specialist recommends *any* Hewitt rubber product, you can be sure it is "Job-Engineered" to match the requirements of *your* operation. So when every minute counts, call on him. His knowledge is yours for the asking.

Specify "Hewitt" . . . Phone the Hewitt distributor listed in the classified section of your telephone directory. Or write to Hewitt Rubber of Buffalo, 240 Kensington Avenue, Buffalo 5, New York.

Monarch Air Hose

HEWITT RUBBER
OF BUFFALO
Division of Hewitt-Robins Incorporated

"JOB-ENGINEERED" INDUSTRIAL HOSE • BELTING • PACKING

Introducing
the New CELFOR CATALOG!

A "Best Teller" for men who sell, use and maintain cutting tools.

- **a complete catalog listing of Celfor high speed Twist Drills, Reamers and Carbide Inserts, 96 Pages**
- **a 24-page Engineering Data section with valuable helps on assigning the right tools to the right job and practical ideas on tool maintenance—all aimed at more efficient tool performance and longer tool life.**

You'll find this catalog invaluable on your reference shelf.

Request for this catalog should be on your business letterhead and state your position.

CELFOR TOOLS
Division of CLARK EQUIPMENT COMPANY
BUCHANAN, MICHIGAN
OTHER PLANTS—BATTLE CREEK, JACKSON, BERRIEN SPRINGS, MICHIGAN

Products of CLARK • TRANSMISSIONS • ELECTRIC STEEL CASTINGS
AXLES FOR TRUCKS AND BUSES • AXLE HOUSINGS • BLIND RIVETS
INDUSTRIAL TRUCKS AND TRACTORS • HIGH-SPEED DRILLS AND REAMERS
METAL SPOKE WHEELS • GEARS AND FORGINGS • RAILWAY TRUCKS

Prices on CLARK products will not be advanced in excess of increased costs.

Plant Equipment Previews

(Continued from page 214)

FEBRUARY, 1947

PEP 73

INFRA-RED APPLIANCE

Selection Board's Opinion: Flexible and versatile unit.

Manufacturer: The Miskella Infra-Red Co., E. 73rd & Grand Ave., Cleveland 4, Ohio.

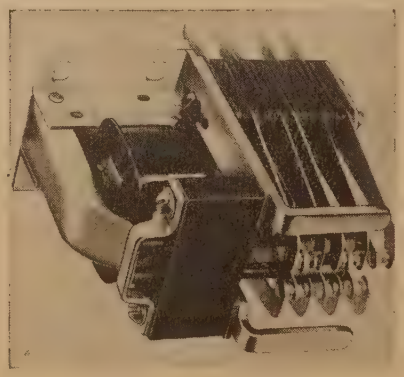
Features: Preforms of all types may be pre-heated uniformly and quickly by placing them on open shelf a few minutes before time to place in mold. Wiring is standard for 230 volts; lamps are sealed in reflector type, 250 watt with life of 5000 hours; eight lamps in all with total load of 2000 watts. One half of unit may be used only, if desired.

FEBRUARY, 1947

PEP 74

ALTERNATING CURRENT RELAY

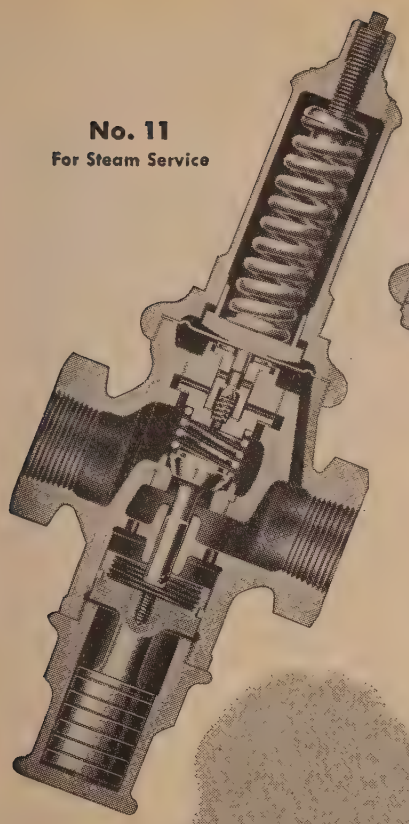
Selection Board's Opinion: High insulating properties.



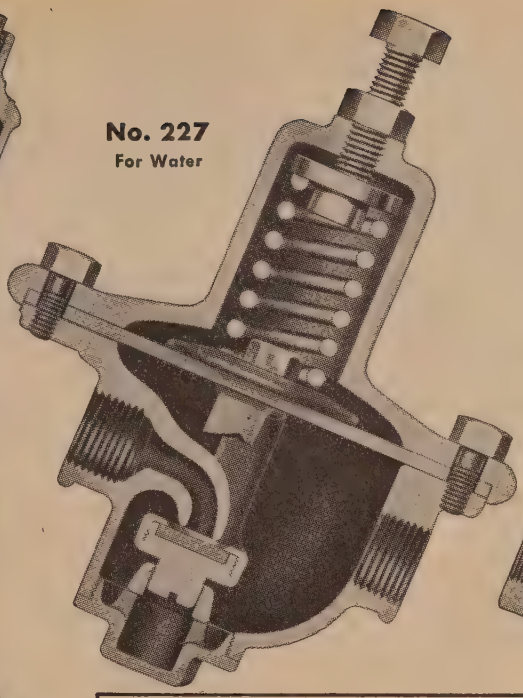
Manufacturer: Eastern Industries Inc., East Norwalk, Conn.

Features: A compact, fast acting, reliable, relay for vehicle-actuated traffic control systems. The relay stands up in these traffic control systems under duty as high as 10,000,000 operations per year. A circuit closure of as little as .010 seconds operates the relay cleanly. To meet the requirement of high insulation resistance, each contact spring is individually encased in phenolic insulation.

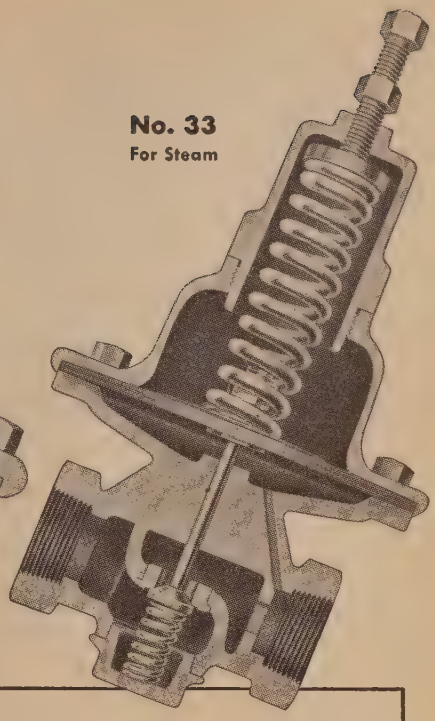
(Continued on page 218)



No. 11
For Steam Service



No. 227
For Water



No. 33
For Steam

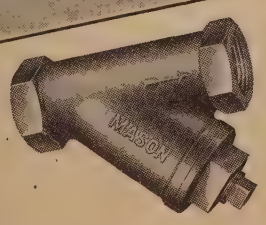
MASONEILAN REGULATORS

Chisel Down Operating Costs

OF PRESSURE REDUCING SERVICE

For years Masoneilan Regulators have been handling tough pressure reducing jobs . . . steam, water and air . . . that's the reason why plant men insist on Masoneilan when they need new regulators. Always ready to maintain uniform pressures, Masoneilan Regulators cut operating costs by providing accurate pressure control under any condition for which they are designed. Their sturdy construction assures long life with little, if any, maintenance costs.

Keep your pressure reducing costs down, install Masoneilan Regulators in your plant. Write for catalog No. 73 today. It gives complete information on these and other types of Masoneilan Regulators.



MASONEILAN STRAINERS

Prevent scale, dirt, chips, etc. from damaging regulators, traps, valves and pumps . . . use Masoneilan Strainers. These precision-made strainers keep out all foreign matter. They'll eliminate maintenance delays and save money.

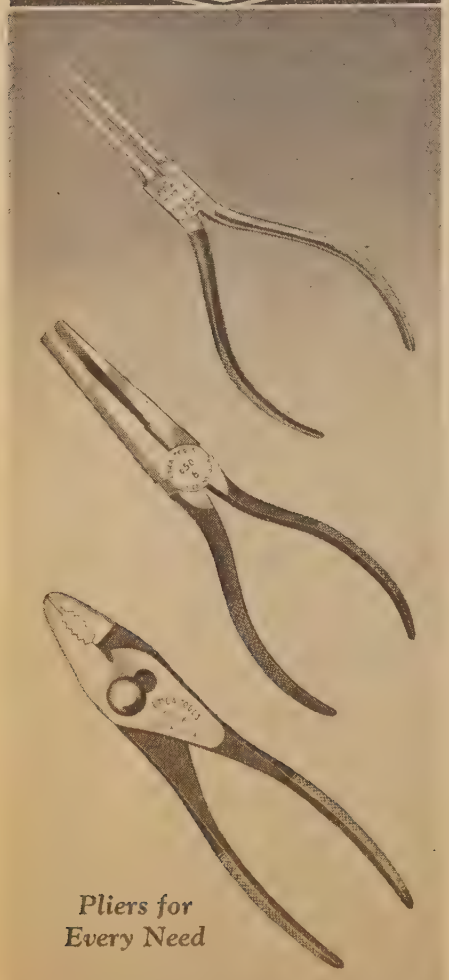
MASONEILAN

MASON-NEILAN REGULATOR CO.

1183 ADAMS ST., BOSTON 24, MASS., U. S. A.

New York Chicago St. Louis Philadelphia Houston Tulsa
Pittsburgh Los Angeles Cleveland Atlanta San Francisco
Mason Regulator Co. of Canada, Ltd., Montreal, Canada

CREATED BY
Utica
FOR MORE TOOL MILEAGE



Pliers for Every Need

UTICA Pliers and Adjustable Wrenches are precision made for ease of handling and longer life . . . *more tool mileage*. . . New equipment and methods, developed during the war . . . make UTICA tools better than ever. Sold through recognized jobbers.

UTICA
DROP FORGE & TOOL
CORPORATION
UTICA 4, NEW YORK

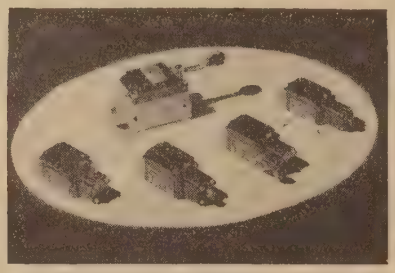
Plant Equipment Previews

(Continued from page 216)

FEBRUARY, 1947
PEP 75

OILPROOF LIMIT SWITCHES

Selection Board's Opinion: Oilproof design.



Manufacturer: General Electric Co., Schenectady 5, N. Y.
Features: A small oilproof track-type switch designed for machine tool or similar applications. The switch can be used in a variety of operations through the use of interchangeable operating heads for roller-lever, roller-push-rod, push-rod, or plunger operation. A sturdy, molded phenolic oilproof enclosure protects it from lubricating oils, etc.

FEBRUARY, 1947
PEP 76

HAND EXTINGUISHER

Selection Board's Opinion: Requires only one hand to operate efficiently.

Manufacturer: Union Stop-Fire Corp., Brooklyn, N. Y.
Features: As easy to use as a garden hose. All the user has to do is to point the hose at the fire and give the readily accessible valve a quick flick with the fingers to release an instantaneous stream of fluid. It has a long range, the bulk of the stream traveling from 15' to 25'.

(Continued on page 221)

Free literature—

Post card between

pages 170 & 171

Keeps Count On Production

Industry's favorite "Watchdog of Production" since 1906 . . . Redington Counters are ***widely used*** on punch presses, pumps, screw machines, packaging machines . . . conveyor lines, can making and box making machinery . . . in fact ***all types*** of machinery . . . and production lines. Easy to install . . . ***100% accurate.*** Write for new catalog.

F. B. REDINGTON CO.
118 So. Sangamon St., Chicago 7, Ill.

ALLEN
REG. U. S. PAT. OFF.

Over 140 formulas for

SODERING
BRAZING
WELDING

L. B. ALLEN CO. INC.
6733 Bryn Mawr Ave. • Chicago 31, Illinois

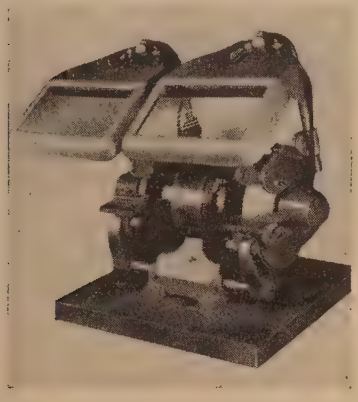
Plant Equipment Previews

(Continued from page 218)

FEBRUARY, 1947
PEP 77

SPOT-LIGHT SHIELD

Selection Board's Opinion: Incorporates its own illumination.

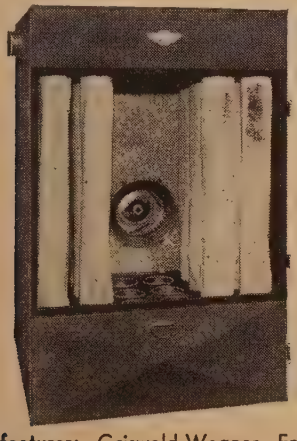


Manufacturer: Surty Manufacturing Co., 4139 W. Kinzie St., Chicago 24, Ill.
Features: Spot light is attached on under side of the shield so it can be adjusted for spotlighting any grinding, buffing or polishing operation. This makes for complete safety, greater precision and speed of operation.

FEBRUARY, 1947
PEP 78

DUST COLLECTOR

Selection Board's Opinion: Many improvements in design.



Manufacturer: Griswold-Wegner Engineering Co., 1703 Peoria Rd., Springfield, Ill.
Features: Designed for industry to collect dust and abrasives at the source, separate the dirt and dust from the air, release filtered air and return it to the room at room temperature.

FEBRUARY, 1947
PEP 79

ELECTRONIC COMBUSTION SAFEGUARD SYSTEM

Selection Board's Opinion: Good protective features.
Manufacturer: Combustion Control Corp., 77 Broadway, Cambridge 42, Mass.
Features: Combines in a single unit the

(Continued on page 222)

with **CHAMPIONS**

CHAMPION **Fluorescent** and *Incandescent* **Lamps** are made and tested to provide the most efficient, low cost industrial light. Back of them is an organization of specialists in industrial lamp manufacture, with trained lighting experts in the field to give you dependable counsel on correct lighting for every part of your plant.

Champion Lamp economy is the result of careful teamwork by a manufacturing and distributing organization set up to get lamps to you at minimum cost. When you standardize on Champion Lamps you can be certain of getting the most lighting and lamps for your money.

May we put you in touch with the Champion distributor in your locality?

CHAMPION LAMP WORKS
Lynn, Massachusetts
A DIVISION OF CONSOLIDATED ELECTRIC LAMP CO.

Look in a Microscope

FOR LONGER BEARING LIFE

To the naked eye bronzes look pretty much alike. But through a microscope the difference between Shook bronze and ordinary bronze is readily apparent. In Shook bronze the grain structure is more homogeneous, the matrix size smaller, large lead crystals are absent. The result . . . a better, longer wearing bronze, which being denser, has increased strain resistance without increased hardness. How does Shook do it? By employing Radial Grain Control . . . an exclusive radial die-casting process. This better bearing bronze is available to you as bushings in 800 stock sizes. There are also over 450 sizes of bored and solid bronze bars . . . machined on all surfaces . . . concentric . . . ready for your finish cut . . . guaranteed to machine to the size marked on them . . . to give complete satisfaction.

Look to Shook for your bronze bearing requirements. Ask your dealer for them. Write for Catalog 45 which lists all sizes . . . gives other valuable bearing data.

BUSHINGS • BAR STOCK • BABBITTS

SHOOK BRONZE

CORPORATION

GREENLAWN AND LAKE STREETS • LIMA, OHIO

SB-120

Plant Equipment Previews

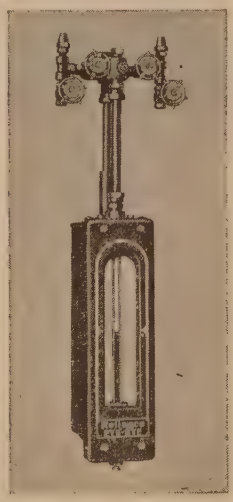
(Continued from page 221)

most modern and reliable safeguards against hazards of flame failure and dangerously low boiler water level. When flame fails, the fuel is instantly cut off or an alarm is sounded. Unlike thermal controls, mechanism is actuated not by the effect of flame failure but by the flame itself. Action is instantaneous.

FEBRUARY, 1947
PEP 80

REMOTE-READING LIQUID LEVEL INDICATOR

Selection Board's Opinion: Strong and compact.

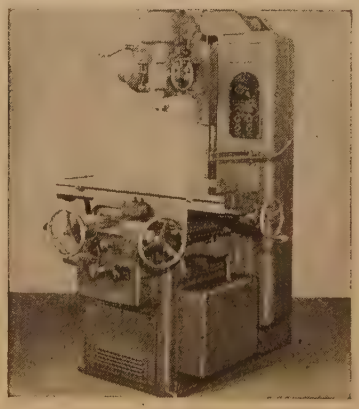


Manufacturer: The Reliance Gauge Column Co., Cleveland, Ohio.
Features: Use of a plastic diffusing screen improves the distribution of the interior illumination. The case has been made drip-proof and the arrangement of the interior more accessible for cleaning and renewing of illuminating lamp.

FEBRUARY, 1947
PEP 81

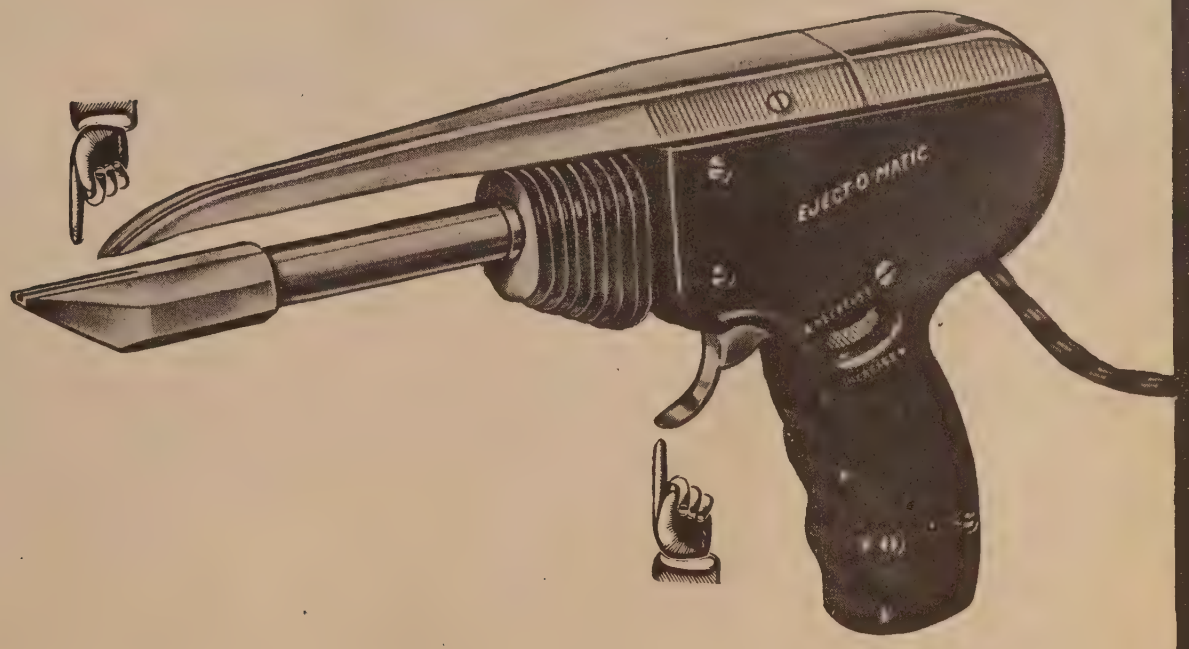
MILLING MACHINE

Selection Board's Opinion: Many improved features.



Manufacturer: Reed-Prentice Corp., Worcester 4, Mass.
Features: Universal head, centralized control panel and infinitely variable feeds and spindle feeds make this machine ideal for

(Continued on page 224)



FOR FASTER, MORE ECONOMICAL SOLDERING!

THE SOLDERING TOOL WITH *Automatic Feed*

At a touch of the trigger, stainless steel knives eject a measured amount of solder. A loading chamber in the handle provides housing for a 4-ounce reel of solder. For continuous, all-day production, solder may be fed through the EJECT-O-MATIC from large reels mounted on, or under, the bench. A special eyelet hole is provided for this purpose in the cover of the loading chamber. EJECT-O-MATIC Automatic Feed, with core solder, eliminates fussing with fluxes—makes soldering a one-hand operation — speeds production — assures neat, uniform joints. The 50, 75, 100 and 150 watt models are now available. Tips may be had in 6 different sizes and shapes.

Approved by Underwriters' Laboratories, Inc.

CONSIDER THESE BIG FEATURES

- Micrometer Control of Amount of Solder Ejected
- Anti-fatigue Balance—Light Weight
- Automatic Solder Retracting Feature—Prevents Melting of Excess Solder
- Cooling Vanes Dissipate Excess Heat
- Multi-clad, 400-hour Tip, no tinning, no filing
- One-hand Operation—Speeds Production
- Safety, Utility Base

Model 19-S *(illustrated)* with base—retails at $18.95

Individually packed. Shipping wt. per carton of 12 units, approx. 42 lbs.

Send for literature

AUTOMATIC-FEED SOLDERING TOOL

EJECT-O-MATIC

HOUSES · MEASURES · EJECTS THE SOLDER

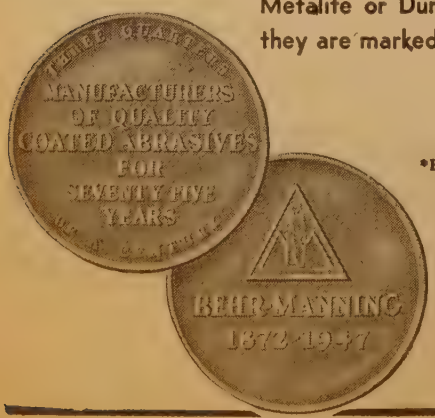
MULTI-PRODUCTS TOOL COMPANY, 123 SUSSEX AVENUE, NEWARK 4, NEW JERSEY

SPEED-WET*
brings you
RESIN-BOND
PRODUCTION
for dry or coolant grinding

Resin-bond production is premium production—improved speed, stamina and finish at lower cost. Why? Because each individual abrasive grain in Speed-wet resin-bonded products is twice anchored in a heat-set resin adhesive, which, once hardened, can never remelt or flow or release its grip.

When used dry, Speed-wet resin-bonded abrasives are immune to cutting heats and humidity. Used wet, they are impervious to water, cutting oils or coolants.

Thus, for dry or coolant grinding, or for polishing and finishing of metals or glass or plastics, Speed-wet resin-bond abrasives deliver extra performance. Specify Speed-wet Metalite for aluminum oxide grit—or Speed-wet Durite for silicon carbide. Metalite or Durite, they're both resin-bonded if they are marked Speed-wet*.



*Reg. U. S. Pat. Off.

BEHR-MANNING
(DIVISION OF NORTON COMPANY)
TROY, N. Y.

Plant Equipment Previews

(Continued from page 222)

die sinking, duplicating, boring, drilling and face or straddle milling. Electronic feed drive provides a feed range of approximately 100 to 1, namely from 1/4" to 24" per minute for table and saddle and from 5/32" to 16" for Ram.

FEBRUARY, 1947
PEP 82

TRANSFORMER

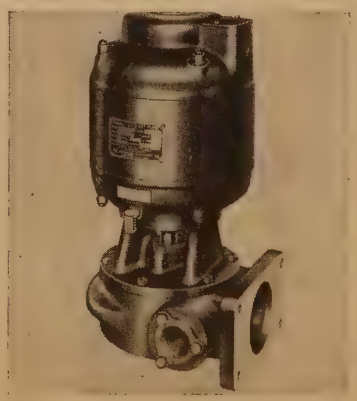
Selection Board's Opinion: Small and compact design.

Manufacturer: Marcus Transformer Co., Hillside 5, N. J.
Features: Constructed thruout with class B, heatproof insulation, these transformers withstand the severest of operating conditions, eliminating necessity of messy liquids and fireproof vaults. Available in sizes up to 500 KVA in voltages to 13,000 volts. Stock rating 240/480 Primary, 120/240 Secondary, 60 cycles, 60 phase.

FEBRUARY, 1947
PEP 83

BALL BEARING MOTOR DRIVEN PUMP

Selection Board's Opinion: All position application of high capacity.



Manufacturer: The Rutherman Machinery Co., Cincinnati 2, Ohio.
Features: Can be installed either below or above the reservoir, in a horizontal or vertical position. When desired, it can be converted to pipe inlet type by use of an adapter plate available in several sizes.

(Continued on page 226)

DO HARD JOBS THE EASIER WAY...

with Thor

HEAVY-DUTY DRILLS

THOR HEAVY DUTY ½" ELECTRIC DRILL—the original, close-coupled, smaller, lighter half-inch electric drill. No other electric drill of similar size offers such compact power and light weight convenience and high efficiency for continuous service on hard production and maintenance jobs. There's a full range of Thor sizes—*a tool for every need*—all compactly designed, well-balanced and ruggedly built. *For full information ask your nearby Thor Distributor or write for catalog.*

INDEPENDENT PNEUMATIC TOOL COMPANY
600 W. Jackson Boulevard, Chicago 6, Illinois
Birmingham Boston Buffalo Cincinnati Cleveland Denver Detroit Houston Los Angeles Milwaukee New York
Philadelphia Pittsburgh St. Louis St. Paul Salt Lake City San Francisco Toronto, Canada London, England

Thor PORTABLE POWER TOOLS

PNEUMATIC TOOLS • UNIVERSAL AND HIGH FREQUENCY ELECTRIC TOOLS • MINING AND CONTRACTORS TOOLS

Your Local Distributor Can Deliver From Stock

Write for Catalog Sheets showing and describing this most complete line of belt fastening needs — Belt Hooks, Belt Lacing, Lacing Machines, Round Belt Hooks and Couplings and Gear Wheel Pullers.

Because of our greatly increased production facilities, we are continuing to keep our industrial distributor stocked with *both* standard types of belt lacing.

WIREGRIP BELT HOOKS (6 sizes) come with the extra blue patented aligning cards that prevent card end waste—every hook usable. Applied with WIREGRIP or any other standard make lacing machines.

STEELGRIP BELT LACING—(11 sizes) come in convenient boxes or long lengths for wide conveyor belts. 2-piece hinged rocker pins take up wear and increase flexibility. Applied with a hammer, penetrates toughest belting, clenches into a smooth, "humpless" joint. STEELGRIP compresses and protects belt ends, prevents fraying of fabric belts.

ARMSTRONG-BRAY & CO. *"The Belt Lacing People"* 5358 Northwest Highway, Chicago 30, U.S.A.

● You pay a share of this tremendous loss, if you fail to protect iron and steel surfaces from the metal-consuming "fire" of rust. Yet, rust CAN be *stopped* by sealing the surface so that no oxygen can reach and oxidize it. RUST-OLEUM combats rust as effectively as water quenches fire.

For less than 1-cent per square foot you can add years of life to metal roofs, gutters, smokestacks, fire escapes, railings, and fences. RUST-OLEUM will positively stop and prevent rust on all types of metal surfaces.

See your distributor or write for catalog No. 246

EASY TO USE . . . LASTING PROTECTION

- No expensive preparation. Merely wire brush to remove scale, dirt, etc.
- RUST-OLEUM penetrates remaining rust and incorporates it within the protective film.
- RUST-OLEUM does not crack, blister or peel.
- Excellent coverage . . . Lasts longer.
- Full selection of colors.

APPLY BY BRUSH, DIP OR SPRAY

RUST-OLEUM CORPORATION 2411 Oakton Street, Evanston, Illinois

Plant Equipment Previews

(Continued from page 224)

FEBRUARY, 1947

PEP 84

SWITCHBORD TACHOMETER

Selection Board's Opinion: Wide range of scales for remote control use.

Manufacturer: Metron Instrument Co., 432 Lincoln St., Denver 9, Col.

Features: Has 5 heads and 3 speed ranges. The instrument has permanently mounted tachometer heads at 5 different machines, wired to the central indicating unit by ordinary BX conduit or cable. Scale of tachometer shows 3 speed ranges. These may be any range between 1 rpm and 50,000 rpm full scale. Uses 115 Volt AC.

FEBRUARY, 1947

PEP 85

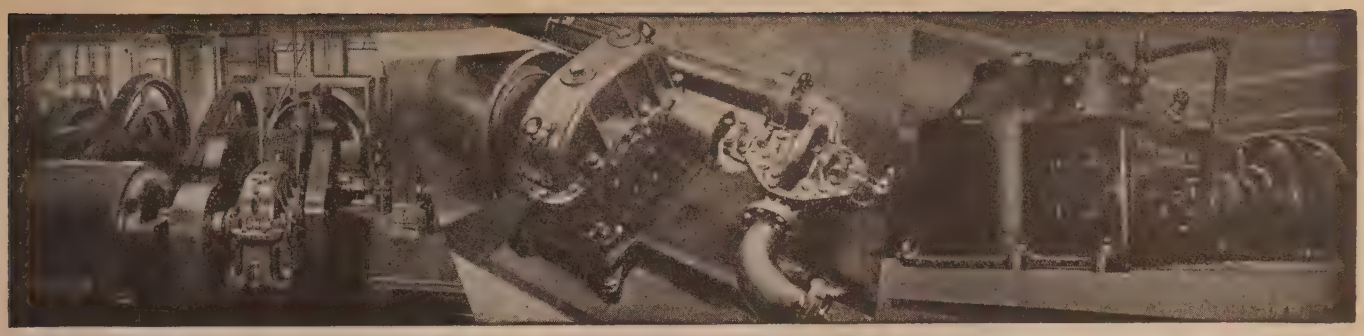
SELF-SEALING TEST PLUG

Selection Board's Opinion: Self-sealing feature outstanding.

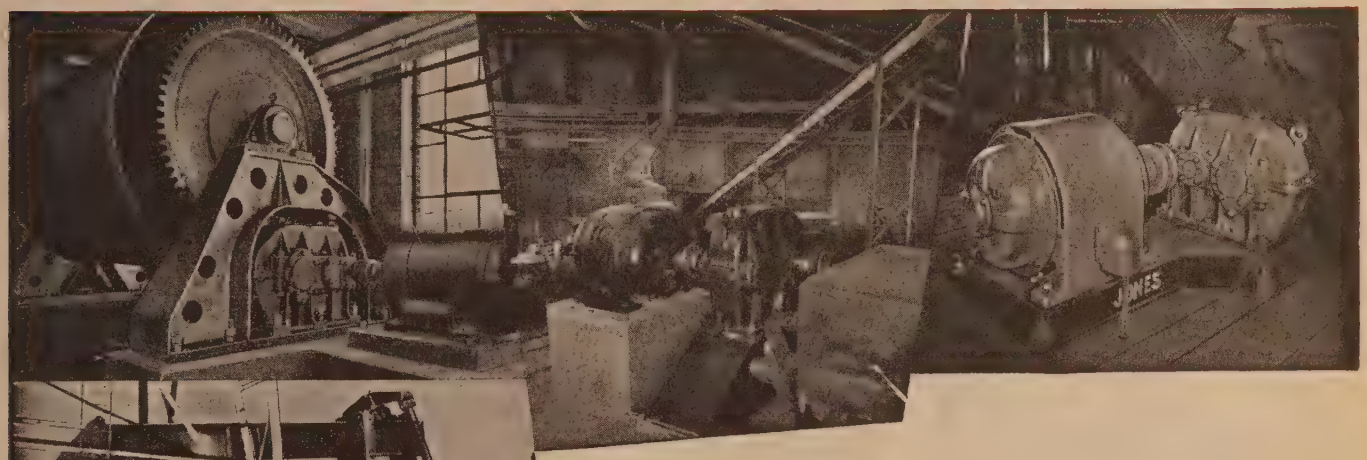
Manufacturer: Mechanical Products Corp., 168 N. Ogden St., Chicago 7, Ill.

Features: For use in closing openings in tanks, boilers and other vessels, requiring hydrostatic or pneumatic internal pressure tests. The testing pressure from within the tank is utilized to hydraulically or pneumatically force and hold the seal against its seat. Available for pipe openings from ½" to 2" sizes.

(Continued on page 228)



JONES DRIVES FOR INDUSTRY



For many years the W. A. Jones Foundry & Machine Company has been called upon as a consultant, to help solve a great variety of difficult drives involving the use of speed reducers, gears and other transmission machinery. In many cases these installations have called for the development of special equipment, designed and built to suit the specific requirements of the project.

As a result of these years of experience, involving numerous special problems in the mechanical transmission of power, the Jones organization has collected a vast amount of technical data relating to work in various fields.

Specific bulletins and catalogs are available on the products listed below and a general 20 page bulletin "Jones Drives for Industry" presents a broad picture of Jones products, engineering services and manufacturing facilities.

W. A. JONES FOUNDRY & MACHINE CO.
4449 Roosevelt Road, Chicago 24, Illinois

JUST ASK FOR BULLETIN NO. 80

• These illustrations show application of Jones drives to solve a wide range of industrial power transmission problems.

Jones

HERRINGBONE—WORM—SPUR—GEAR SPEED REDUCERS • CUT AND MOLDED TOOTH GEARS • PULLEYS
ANTI-FRICTION PILLOW BLOCKS • V-BELT SHEAVES • FRICTION CLUTCHES • TRANSMISSION APPLIANCES

EITHER That Microbe GOES OR I Do BOSS!

Strong talk from a worthy working girl to Mr. Head Man!

But then—whether she expresses her sentiments aloud or not—that's just about how strong her attitude is on the subject of cleanliness.

The straight-from-the-shoulder truth is—many an employee feels there isn't room enough in an organization to hold both herself and a neglected, unsanitary washroom.

That home-clean, spic-and-span washrooms inspire permanent loyalty, help prevent the spread of disease, reduce absenteeism and increase efficiency accordingly . . . is no idle washroom chatter. Surveys staunchly back up the facts.

Employees, after all, are as humanly sensitive to their surroundings as the "Boss" himself.

And that's good enough reason why so many alert employers the country over are "heading West" . . . meaning the use of West Washroom Service. Provenly the *West Way* is *one* way of keeping company morale *high* by keeping the "germ count" *low*.

Products That Promote Sanitation

WEST Disinfecting Company

42-16 WEST STREET
LONG ISLAND CITY 1, N. Y.

★ BRANCHES IN PRINCIPAL CITIES OF THE UNITED STATES AND CANADA

CLEANSING DISINFECTANTS • INSECTICIDES • KOTEX VENDING MACHINES
PAPER TOWELS • AUTOMATIC DEODORIZING APPLIANCES • LIQUID SOAPS

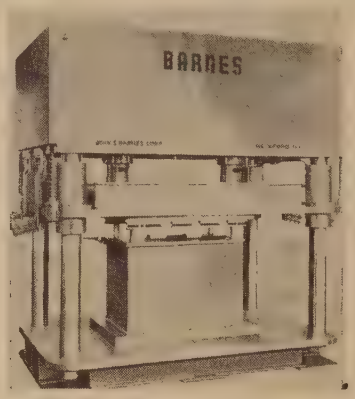
Plant Equipment Previews

(Continued from page 226)

FEBRUARY, 1947
PEP 86

HYDRAULIC PRESSES

Selection Board's Opinion: High production unit.

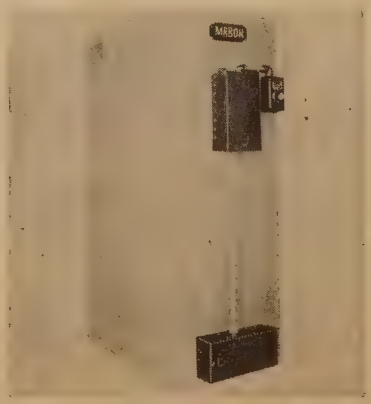


Manufacturer: John S. Barnes Corp., 152 Walnut St., Rockford, Ill.
Features: Two models; 24 ton and 50 ton capacity. Designed for the piercing, punching, forming and drawing of sheet metal parts. Each press is powered by a self-contained hydraulic unit which insures smooth press operation under constant finger-tip control. Dual electric controls insure safety and flexibility of operation.

FEBRUARY, 1947
PEP 87

VAPOR DEGREASER

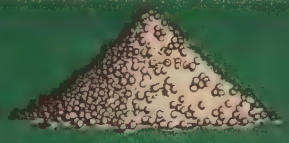
Selection Board's Opinion: Complete, self-contained unit.



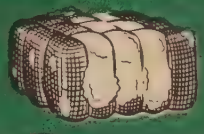
Manufacturer: Mabor Co., Clark Township, Rahway, N. J.
Features: Employing an ingenious controlled cool-air principle, the degreaser is self-distilling and completely self-contained, thereby eliminating need for an outside barrel. Built-in storage tanks are part of the unit. Its contents can be distilled without danger of overheating.

Have you ordered your set of Maintenance Manuals? Manual No. 18 on Gear Drives appears on Page 137.

whether it's a load of golf balls . . .



or a bale of cotton . . .



YOU CAN MOVE IT EASIER • FASTER • CHEAPER with the NEW AEROL UNIVERSAL HAND TRUCK

The new Aerol Universal Hand Truck can save you money and muscle because it's scientifically engineered to handle every moving problem. Of one-piece permanent mold aluminum alloy, it combines lightness, strength and durability. Big 12 inch Aerol aluminum rubber-tired wheels give the truck an easy-rolling load capacity especially suited for rugged, heavy-duty railroad or stevedore work.

CHECK THESE FEATURES:

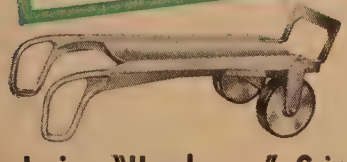
1 40% lighter than average hand truck of comparable capacity.
2 Full axle permits greater flexibility in wedging toe plate under loads.
3 Patented "Handsaver" grip gives maximum ease in breaking over load.
4 Only 60" hand truck with 60" load carrying surface.
5 Equipped with Aerol wheels with Timken Tapered Roller Bearings.
6 Smooth, one-piece construction.

Clean, smooth, functional design

A tapered concave bed to handle barrels, drums, packages of all sizes...no bolts, slivers, or members to catch on sacks.

IMPORTANT NOTICE!

If your Aerol Universal Hand Truck ever needs replacing, merely ship it to us and we'll send you a new one at one-half the current list price.



Exclusive "Handsaver" Grip

Aerol's "Handsaver" grip protects operator's hands, gives 360° gripping angle and allows full 60" area for load. Handles act as legs, permitting operator to walk up close to truck without bumping or banging knees or thighs.

Sturdy X Channel Aluminum Frame

The Universal differs from other hand trucks in that it has a concave overall bed of solid aluminum with rigid X frame supports cast in unit. There are no cross-members to tighten up and replace, and tendency for truck to weave under heavy loads is eliminated.

Furnished with Aerol aluminum wheels

Aerol wheels have factory-greased high precision Timken Tapered Roller Bearings ...are corrosion-resistant and spark-proof ...they roll silently and effortlessly on superior solid rubber tires that are guaranteed not to separate from wheel core or mark floors. They resist oil and water.

Model No.	SPECIFICATIONS										
	Effective Carrying Surface	WIDTH		Skirt Lgth	Nose Lgth	WHEELS				AXLE SIZE	APPRX WEIGHT
		At Handles	At Nose			Catalog No.	Dia.	Face Rubber Tired	Hub Lgth		
U-60	60"	23"	16-1/4	39"	8"	W1232-06	12"	2-15/16	3-1/4	3/4"	100 lbs.

IMMEDIATE DELIVERY!

AEROL CO.
1823 East Washington Boulevard
Los Angeles 21, California

For Complete information, Write Dept. MF-2.

HI-LIFT
E-X-T-E-N-S-I-O-N SCAFFOLD

EXTENDS TO ANY DESIRED HEIGHT IN A VERY FEW MINUTES!

All units built to order and designed to meet individual requirements. Collapsed height is 6' 10". Add 6 ft. to heights below to get working height.

UNIT A: Extends to all heights up to 16 feet.

UNIT B: Extends to all heights up to 20 feet.

UNIT C: Extends to all heights up to 26 feet.

Units with other maximum heights if required.

When collapsed, HI-LIFT readily passes through 2' 6" x 7' opening. One-man operated, readily handled in tight places. Saves man power. Base straddles ordinary obstructions such as desks, lathes, etc. Adjustable outrigger braces provide positive locking in any position, which means absolute safety. Steady non-tipping base. Sturdy, all-welded steel construction. Write for specifications, stating height requirements.

ATLAS INDUSTRIAL CORP.

849 39th STREET, BROOKLYN 32, N. Y.

Ideas From Industry

(Continued from page 151)

studied from literature and drawings only. At the Power Show I saw the pump in actual operation in a hi-pressure system, using a new type of gas-filled accumulator. Questions regarding design, construction, operation and application were answered by engineers direct from their factory."

J. M. Mooney found, "The display of magnesium gangways for railroad cars and truck loading was new. These would be a very good investment and would eliminate the present method of using heavy and awkward gangways made of wood and steel."

(Continued from page 162)

land, Ohio; Walter Jominy of the Chrysler Corp., Detroit, Mich.; Dr. A. H. d'Arcambal, Pratt and Whitney Airplane Division, Hartford, Conn.; Dr. Francis B. Foley, The Midvale Co., Philadelphia, Pa.; Dr. John Chipman, Professor of Metallurgy, Massachusetts Institute of Technology, Cambridge, Mass.; Dr. C. H. Herty, Jr., Bethlehem Steel Corp., Bethlehem, Pa.; Given Brewer, Consulting Metallurgist, Laguna Beach, Calif.; Dr. V. N. Krivobok, International Nickel Co., N. Y.; Dr. E. H. Dix, Jr., Aluminum Company of America, New Kensington, Pa.; Dr. J. C. MacDonald, Dow Chemical Co., Midland, Mich.; R. M. Burns, Bell Telephone Laboratories, Murray Hill, N. J.; F. T. Letchfield, vice president, Wells Fargo Bank and Union Trust Co., San Francisco, Calif.; Dr. Arthur E. Focke, Diamond Chain and Manufacturing Co., Indianapolis, Ind.; Glen Riegel, Caterpillar Tractor Co., Peoria, Ill.

On Wednesday evening, March 26, the Palace Hotel, San Francisco, will be the scene of the Western Metals Congress and Exposition dinner dance.

● Diesel Manufacturers Meet

E. J. Schwanhausser, vice-president of Worthington Pump & Machinery Corp., was re-elected president of the Diesel Engine Manufacturers Association at the association's annual meeting December 11 in Chicago.

Also returned to their posts as vice-presidents of the association were: J. E. Peterson, vice-president of General Machinery Corp., and Gordon Lefebvre, president of Cooper-Bessemer Corp. Robert H. Morse, Jr., vice-president and general sales manager of Fairbanks, Morse & Co., was reelected treasurer.

Directors were elected as follows: William E. Corrigan, vice-president of American Locomotive Co.; George W. Codrington, vice-president of General Motors Corp. and General manager, Cleveland Diesel

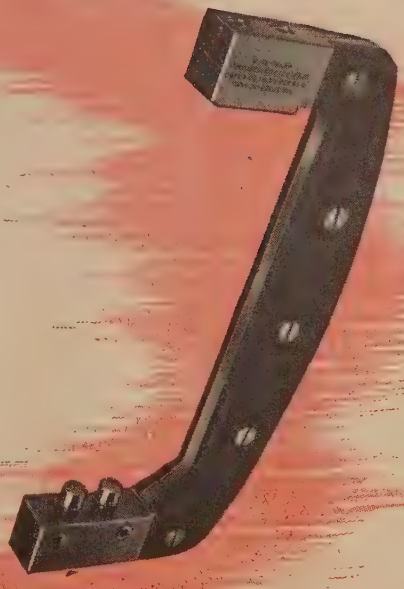
(Continued on page 232)

"Better take some of these up, too, Joe—looks like they've reached bottom on 'em up there."

engineered Tools and Gages by

METRO

Accuracy and precision are yours when you specify METRO. For METRO Carbide Tipped Tools and Gages have been engineered to meet your most exacting requirements by men who know how to make tools for men who know how to use them. No matter what your production needs—whether Standard or Special Tools and Gages—METRO'S industrial experience and knowledge will provide the proper answer. See your distributor or write direct.



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IT GOES ON *TO STAY!*

AND *INSULATES* UP TO 1800° F.

SIMPLY add water, mix and you're ready to do a fast-covering, efficient job with Baldwin Hill No. 1 *Insulating* Cement. To save time for your maintenance men, it sticks *instantly*—does not slide off bottom-surfaces or roll up behind the trowel. To save btu's *for you*, it's compounded of finely nodulated *black* Rockwool—a 3-inch application, for example, reduces 800°F surface temperature to 158°F. Important, too, B-H No. 1 takes expansion and contraction of the insulated surface in stride—without peeling or cracking. And, a special rust inhibitor prevents corrosion, insures a permanent bond even when applied while the surface is hot.

It will pay you to put B-H No. 1 Cement to work on valves, fittings and other irregular surfaces where heat loss is costing you money. Packed in convenient 50-pound multi-wall bags ready for instant use. The coupon brings descriptive literature and a working sample.

Baldwin-Hill

Specialist in Thermal Insulation

SEND ME a sample of B-H No. 1 Insulating Cement and the B-H data book "Industrial Insulation".

Baldwin-Hill Co., 513 Breunig Ave., Trenton 2, N. J.

NAME.....POSITION.....

FIRM.....

ADDRESS.....

CITY.....ZONE....STATE.....

(Continued from page 230)

Engine Division; A. W. McKinney, vice-president and general manager of sales, National Supply Co.; Robert E. Friend, president, Nordberg Mfg. Co.; Norris H. Schwenk, president of Busch-Sulzer Bros.-Diesel Engine Co.; and G. F. Twist, vice-president and general manager, Atlas Imperial Diesel Engine Co.

Harvey T. Hill, who for three years has been executive director of Diesel Engine Manufacturers Association, was appointed to continue in that capacity.

Headlining the speaking program was Charles F. Kettering, general manager, Research Division, General Motors Corp. whose topic was "What is Our Competition?" He used as his theme that progress in Diesel engine development, as in anything else, is made by daring to deviate from established schools of thought. Actual performance of engines occasionally crosses up the most elaborate calculations of the theorist, Mr. Kettering said.

Another high point of the meeting was a day and a half session for the Chief Engineers of DEMA member companies.

The engineers' session was opened by Mr. Schwanhausser, who introduced T. O. Kuivenen of Cooper-Bessemer Corp. as leader of a discussion on the organization of a Diesel engine manufacturer's engineering department. V. O. Harkness, manager of General Diesel Sales for Fairbanks, Morse & Co., asked for suggestions on a proposed reprinting of the Association's book, *Standard Practices*.

Roy A. Hundley, chief engineer of Enterprise Engine & Foundry Co., took over the afternoon meeting which dealt with research programs and activities.

Round Table Conference

Continuing into the next day, the engineers' session ran concurrently with the opening of the annual meeting. Mr. Lefebvre, chairman of the association's educational committee, led the engineers in a round table conference on the relationship between the engineering departments of Diesel engine builders, and the engineering colleges of the country.

Meantime, the annual meeting was under way with Mr. Schwanhausser reviewing DEMA's accomplishments for 1946, and correlating them with plans for 1947. The success of the Association's conference with maritime men at San Francisco on November 7 had resulted in scheduling a similar meet-

(Continued on page 234)

Sterling

"THE WHEELS OF INDUSTRY"

SNAGGING is a "daily grind" that is made easier and quicker by using Sterling's Vitrified or Resinoid Grinding Wheels, especially developed for the job they are to do. For cool operation and faster metal removal, they are ideal because they are built to job-tested formulas for all types of mills and foundries.

What's your problem—casting cleaning, billet grinding, snagging large or small pieces? Whatever it is, there is a Sterling Grinding Wheel built especially to end your grinding worries.

A consultation with a Sterling engineer in your plant . . . right on the job . . . will do much to eliminate trouble-some delays, operator fatigue, and slowed-up schedules. Write today.

The Sterling Specification Selector lists all types of wheels for foundry and steel mill grinding. Send for it now!

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OF THE CLEVELAND QUARRIES COMPANY

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THE WHEELS OF INDUSTRY

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"The Name that Carries Weight"
MATERIAL HANDLING EQUIPMENT

TRAILER TRUCKS

Trailer Trucks, Elevators, Conveyors, Wheel Tractor Cranes . . . Material Handling Equipment of every type. Designed to your requirements by experienced engineers whose reputation is founded upon doing things right. Literature available. Inquiries invited!

T-701—4 Wheel Steer
4 Ton Capacity

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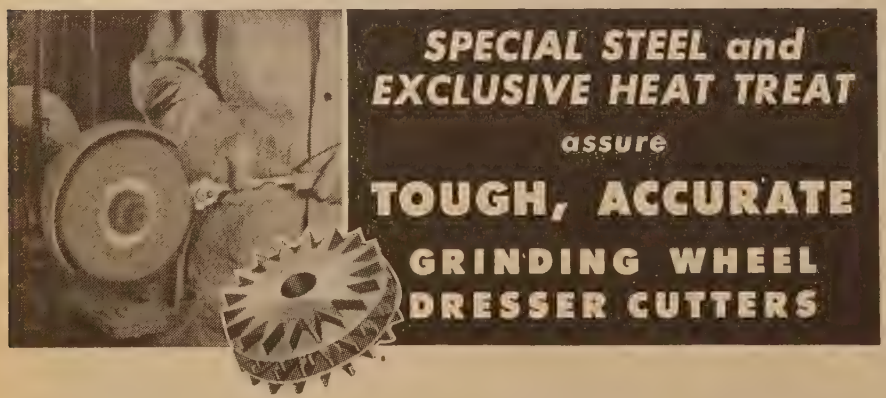
Plant: Clifton, N. J.
SALES REPRESENTATIVE
MERCER-ROBINSON COMPANY, INC.
30 CHURCH ST., NEW YORK 7, N. Y.



Made of special steel—heat-treated by an exclusive VINCENT process, VINCENT-HUNTINGTON Improved Grinding Wheel Dresser Cutters insure long life . . . clean dressing. Exact hardness and controlled heat-treat prevent teeth from mushing or breaking. Accurate, fast and sturdy—they will do the job best for all your hand dressing operations.

Complete stocks in all styles and sizes are carried at your mill supply house. Order a trial quantity . . . the proof is in the using.

Vincent STEEL PROCESS COMPANY
2424 BELLEVUE AVE · DETROIT 7, MICHIGAN

(Continued from page 232)

ing in New Orleans for March, Mr. Schwanhausser said.

Mr. Hill discussed activities the association will engage in during 1947. They include keeping the members informed on legislation in which they will be interested; cooperation in the meeting of the Oil and Gas Power Division, American Society of Mechanical Engineers, to be held in Cleveland next May, and constructive work with colleges and universities in improving educational facilities in the Diesel engine field.

Later Mr. Morse led a session on Diesel engine fuels. Discussion centered on the desirability of cooperation between oil companies and Diesel engine manufacturers, to the end that there will be ample supplies of fuel oils for existent and forthcoming Diesel engines.

An announcement of interest made after the board of directors' meeting, was that the association will begin the writing of a book, *Marine Standards*. Edmund Frederick, assistant chief engineer of Cooper-Bessemer Corp. was appointed chairman of the committee that will undertake the writing of the book.

Another committee was appointed by the engineers to guide discussion that they will hold in future sessions on a number of topics. Chairman of this committee is L. B. Jackson, director of engineering, Diesel Division, American Locomotive Co. Co-chairman of the eastern section of the country is Ralph Boyer, chief engineer, Cooper-Bessemer Corp., and co-chairman for the west is Mr. Hundley. Secretary of the committee is G. L. Bader, chief engineer, Busch-Sulzer Bros.-Diesel Engine Co.

CALENDAR OF EVENTS

Feb. 18 - 20. Magnesium Assn. and U. S. Army Air Forces. Magnesium exhibit; Wright Field, Dayton, Ohio.

March 17-19. American Society of Lubrication Engineers. Annual meeting; Pittsburgh, Pa.

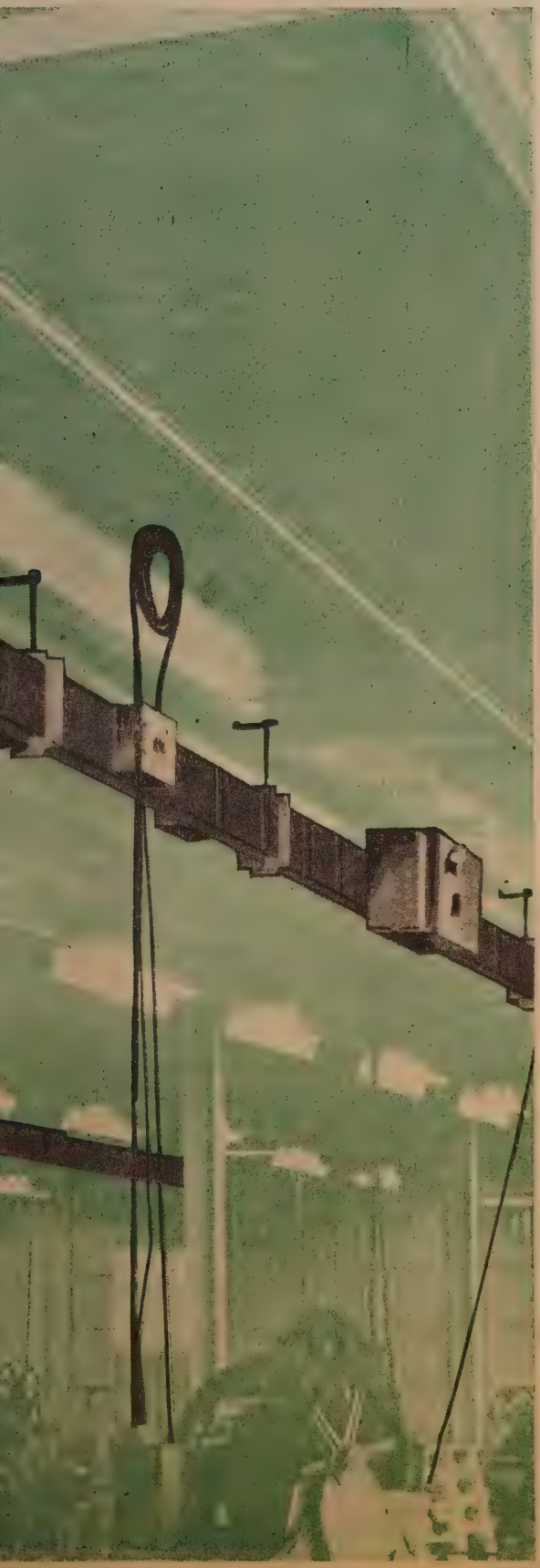
March 17. American Institute of Mining & Metallurgical Engineers. World conference on mineral resources; New York City.

March 19-22. American Society of Tool Engineers. Annual meeting; Houston, Texas.

March 22. American Society for Metals. Western Metal Conference

(Continued on page 238)

move one machine?



DO YOU reach for the red ink when machines must be moved? Do you watch production take a dive because a whole line must be shut down to tap in one machine? And do you wince at the cost of rewiring whenever a shop set-up is changed?

Then get acquainted with BullDog BUStribution DUCT and the multiple advantages of plug-in power that covers your whole-plant.

Every ten-foot section of this modern electrical feeder system has ten convenient outlets. All your electrician has to do when a machine is moved is raise the plug to the nearest outlet, snap its contact fingers over the bus bars and bolt the plug to the casing. He can do it in twelve minutes, or less.

A single machine, or a dozen, can be relocated with no delays for new wiring . . . no interruption of power for the rest of the line.

Because it's built in standardized, prefabricated sections, BullDog BUStribution DUCT can be dismantled, moved and reinstalled in new locations or new combinations without the loss of so much as a single bolt.

A telephone call to your nearby BullDog Field Engineer will bring full technical information on this flexible, economical system of power distribution. Call today, or write BullDog direct for descriptive folders.

• • •

BullDog manufactures Vacu-Break Safety Switches—SafToFuse Panelboards—Superba and Rocker Type Lighting Panels—Switchboards—Circuit Master Breakers—"Lo-X" Feeder BUStribution DUCT—"Plug-in" Type BUStribution DUCT—Universal Trol-E-Duct for flexible lighting —Industrial Trol-E-Duct for portable tools, cranes, hoists.

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ADEQUATE WIRING SERVES AND SAVES

ELECTRIC PRODUCTS COMPANY

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FIELD OFFICES IN ALL PRINCIPAL CITIES
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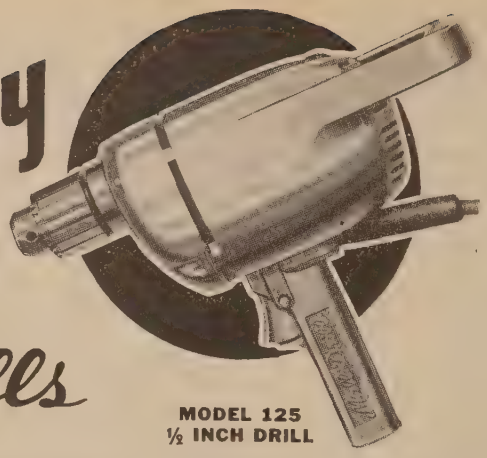
HOLES In A Hurry with MallDrills

REG. U.S. PAT. OFF.



MODEL 125
½ INCH DRILL

The power and stamina of MallDrills cut valuable time from drilling in metal, plastics or wood. Their versatility facilitates cutting holes in form boards for ties, and in rafters for pipe . . . it also adapts them for all other varied drilling jobs on the construction area. They are light weight . . . compact in design . . . and easy to handle. 5 powerful models with ¼" (in two speeds) 5/16", ⅜" and ½" capacities — each available for 110 volt AC-DC or 220 volt AC-DC.

Ask your Supplier or Write Power Tools Division for Literature.

MALL TOOL COMPANY ★ 7705 South Chicago Ave., Chicago 19, Ill.

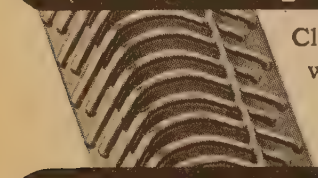
25 Years of "Better Tools For Better Work"

Mall REG. U.S. PAT. OFF. PORTABLE POWER TOOLS

for Better Belt Joints

To keep belts in service longer, use only GENUINE Clipper Belt Hooks applied with Clipper Belt Lacers.

use Clipper Belt Hooks

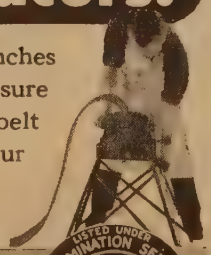


Clipper Hooks are made of the finest quality wire—BETTER than ever before—produced for our exclusive use. Hooks hold with firm, sure grip—give longer satisfactory service.

and Clipper Belt Lacers!

The Clipper No. 9 Portable Lacer laces belts up to 6 inches wide in one quick, easy operation. Under powerful pressure hook legs are embedded flush with the surface of the belt and points clinched, making a perfect joint. Phone your mill supply jobber for a demonstration!

CLIPPER BELT LACER COMPANY, GRAND RAPIDS 2 MICHIGAN, U.S.A.



Clipper

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BELT LACING EQUIPMENT

(Continued from page 234)

and Exposition; San Francisco, Calif.

March 31-April 2. Midwest Power Conference; Chicago, Ill.

April 7-10. National Assn. of Corrosion Engineers. Convention; Chicago, Ill.

April 8-11. American Management Assn. Packaging exposition; Philadelphia, Pa.

April 28-May 1. American Foundrymen's Assn. 51st annual convention; Book-Cadillac and Statler Hotels, Detroit, Mich.

Apr. 29-May 1. Industrial Packaging Engineers Assn. of America. Industrial Packaging & Materials Handling Exposition; Sherman Hotel, Chicago, Ill.

May 5-11. Society of the Plastics Industries, Inc. National Plastics Exposition; Coliseum, Chicago, Ill.

June 17-19. Machinery Dealers' National Assn. Convention; Netherland Plaza Hotel; Cincinnati, Ohio.

● 1946 Strikes Break Record

A report on the first 10-months of 1946 made by the Bureau of Lafor Statistics showed that the number of strikes in 1946 will break the previous record set in 1919. For the first 10 months of 1946, 4,095,000 workers were involved in strikes and this number does not include the coal miners who went on strike in the period following. The 1919 figure of strikes was 4,160,000. Man-days lost through strike idleness were estimated at 102,525,000, or 1.6% of the total available working time of the nation's workers.

● Materials Handling Group

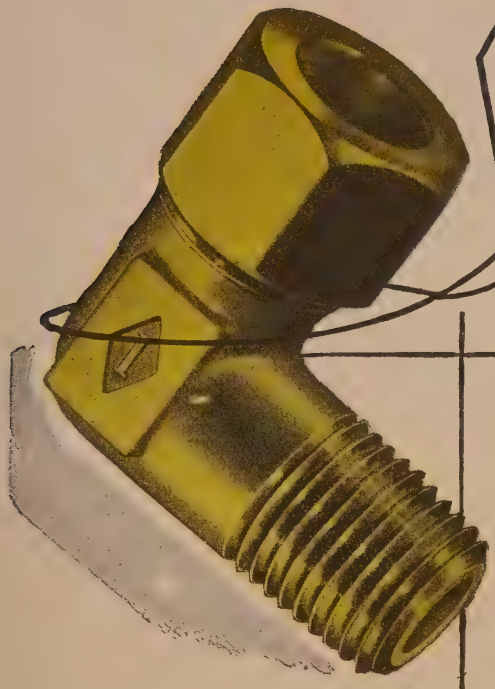
Over 50 specialists in materials handing met for a dinner meeting in Philadelphia, Pa., in December and united to form a permanent organization. Another dinner was held Jan. 10. By interchange of ideas and close personal contact, they propose to advance the application of sound materials handling practice for the mutual benefit of all concerned.

Temporary officers nominated include: chairman, J. B. McGinn of American Viscose Corp.; secretary, C. F. Gross, Philco Corp.; by-laws, Wm. Zelley, J. A. Roebling's Sons Co.; membership, R. G. Benker, General Electric Co., and program, H. B. Hanford, Budd Mfg. Co.

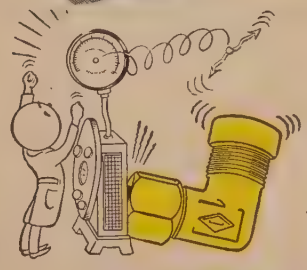
Membership is open to all interested in the problems of ma-

(Continued on page 240)

Now... Finer because they're Forged ☆

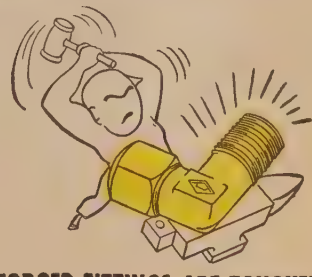


IMPERIAL TUBE FITTINGS
for connecting copper, steel, aluminum and other thin-wall metal tubing.



FORGED FITTINGS ARE STRONGER

Brass forgings are over 80% stronger than brass castings — that's why forged fittings will withstand higher pressures.

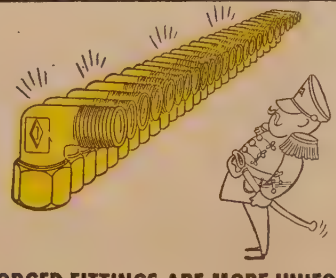


FORGED FITTINGS ARE TOUGHER

Forged fittings stand up better under hard knocks, mechanical shock, and vibration because forging concentrates fiber-like flow line structure of metal at points of stress.

FORGED FITTINGS ARE CLOSER GRAINED

The extremely close-grained structure of forgings assures against blow holes or other concealed defects and against seepage of even hard-to-hold materials.



FORGED FITTINGS ARE MORE UNIFORM

Dimensions of forgings are held within extremely close limits — far closer limits than are possible in the case of castings. This makes fittings easier to install.

DRYSEAL PIPE THREADS

Full length SAE Dryseal Pipe Threads are being incorporated on pipe thread ends. These threads make tight joints without pipe dope; are longer on sizes ¼" and over.

IMPERIAL announces new, finer tube fittings for connecting copper, steel, aluminum and other thin-wall metal tubing. These new fittings have forgings instead of castings on standard elbow and tee bodies and SAE Dryseal Pipe Threads on pipe connections.

The superiority of forged brass fittings has long been recognized. They have been used for hard-to-hold liquids and gases, as in refrigeration, and for work where high pressures are involved. Now, for the first time these better fittings are made available for general industrial applications.

Today, more than ever before, the Imperial Diamond "I" is your assurance of top quality. Write for Bulletin 349.

THE IMPERIAL BRASS MFG. CO., 509 S. Racine Ave., Chicago 7, Ill.

☆ Elbow and tee bodies on Compression, Flared Hi-Duty, Flex and Inverted Flared Tube Fittings are being converted to forgings. Straight fittings made from brass rod.

SEE YOUR INDUSTRIAL SUPPLY HOUSE

IMPERIAL

PIONEERS IN TUBE FITTINGS AND TUBE WORKING TOOLS

STANLEY TOOLS have always been the workman's favorite for hurrying along the job. Their quality and their durability are regularly proved on production cost sheets. The pair shown here at work is typical:

Stanley Ball Pein Hammer — No. 310 — 16 oz.–Octagon pattern–forged, polished head–high grade steel, superheat-treated – polished hickory handle securely wedged by "Evertite" process. Wide choice of sizes.

Stanley Cold Chisel — No. 990 — Quarter octagon pattern – chrome vanadium alloy steel, drop forged, oil hardened and tempered by a special process to produce a tough cutting edge. Sizes, to match the job.

How many hand tools in your plant are still in use yet badly worn? Replacement of these with new Stanley Tools will help cut costs in every department. Order from your distributor. STANLEY TOOLS, 143 Elm Street, New Britain, Connecticut.

THE TOOL BOX OF THE WORLD

STANLEY

Trade Mark

HARDWARE · HAND TOOLS · ELECTRIC TOOLS

(Continued from page 238)

terials handling. Higher efficiency in this field is the prime objective of the new group. Applications can be obtained by addressing the secretary or Mr. Benker, chairman of the membership committee.

The plan is to have meetings each month in 1947 with instructive programs demonstrating latest developments in the field.

● Magnesium Exhibit

Army and Navy designing and engineering personnel, by official request, will assemble at Wright Field, Dayton, Ohio, to attend a Magnesium Exhibit sponsored jointly by the U. S. Army Air Forces and The Magnesium Association, February 18-20. Invitations have also gone out to 3,000 leading industrial executive and engineering representatives.

Lt. General N. F. Twining, USA, Commanding Officer, Wright Field, Air Materiel Command, in conjunction with member companies of The Magnesium Association, are arranging a comprehensive demonstration of present practices and latest developments in Magnesium technology. In addition to industrial exhibits, there will also be exhibits by the Army and the Navy. These exhibits will show design, fabrication and application of today's Magnesium production.

More than 40,000 square feet of floor space is being set aside at Wright Field for this exhibition and demonstrations in order to assure adequate opportunity for a comprehensive presentation of Magnesium. Engineers and technical representatives will be present to answer questions and to explain techniques of production and fabrication.

● Allis-Chalmers Strike Cost

At the end of eight months, a total cost of $36,484,511 was attributed to the strike at the Allis-Chalmers Manufacturing Company's plant at West Allis, Wis. The survey on costs showed that the greater cost of the strike conducted by the United Automobile Workers Union, CIO, has been in lost wages, production and taxes. However, $77,200 was spent in pay for hundreds of policemen assigned to maintain peace on the picket lines. Included in this was $3000 for hospitalization expenses for policemen hurt in the picket line and for equipment damaged or lost.

Expenditures of the Milwaukee

(Continued on page 242)

"A NORTHERN HI-LIFT HOIST up there Would Slash Handling Costs"

An efficient Northern Hi-Lift . . . low-headroom Electric hoist saves in many ways:

1. labor saving

When men lift and move material by hand, the power generated costs you at least $5 per kilowatt hour. Power for a Hi-Lift Electric Hoist costs you less than a nickel per kilowatt hour. Manpower lifting is slow, time wasting, costly. Hi-Lift Hoists do it quickly, economically.

2. time and overhead saving

Inefficient, slow material handling causes delay and countless minutes of lost time all through the shop while other operations wait on handling. Hi-Lift Hoist saves this time and money.

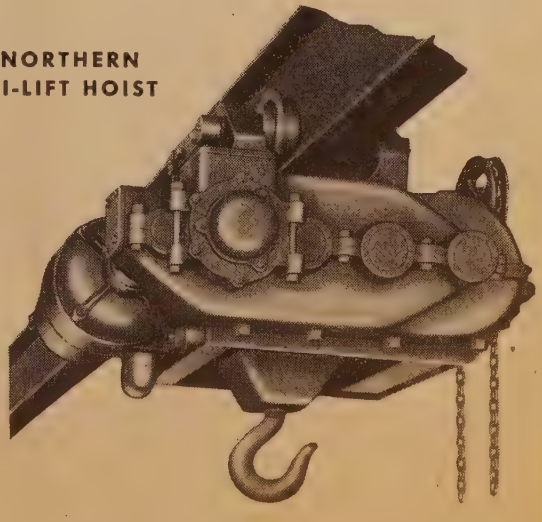
3. saving through safety

Men handling heavy material by hand are subject to serious and costly injuries. Power handling avoids these.

4. saving in floor space and overhead

Northern Hi-Lift Hoists use *no* floor space—carry the material above the floor. There is no vehicle wear on the floor—no danger to workers from rapidly moving vehicles. Aisles are used for work and walk space only—a substantial saving in space. The low-head-room feature of Hi-Lift Hoists makes better use of overhead space—permits handling of bulkier loads.

NORTHERN HI-LIFT HOIST



Northern Hi-Lift Electric Hoists are extremely sturdy, long lasting. Write for Bulletin H-4.

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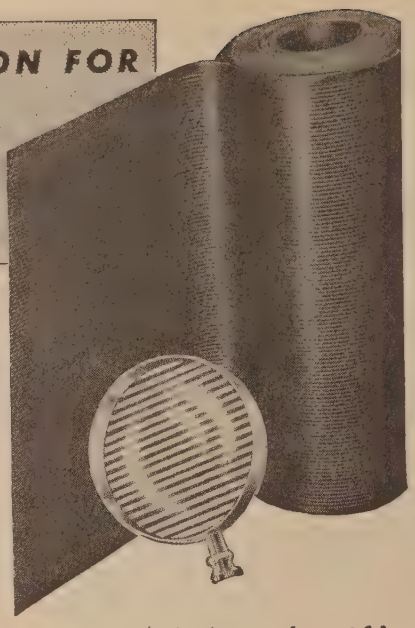
NORTHERN ENGINEERING WORKS

General Offices: 2625 ATWATER ST. DETROIT 7, MICH.

TYPES OF NORTHERN HI-LIFT HOISTS AVAILABLE

Floor controlled hoists • *Motor traveled hoists*
Cab controlled hoists • *Base mounted hoists*

LOW-COST PROTECTION FOR
HEAVY TRAFFIC FLOORS!

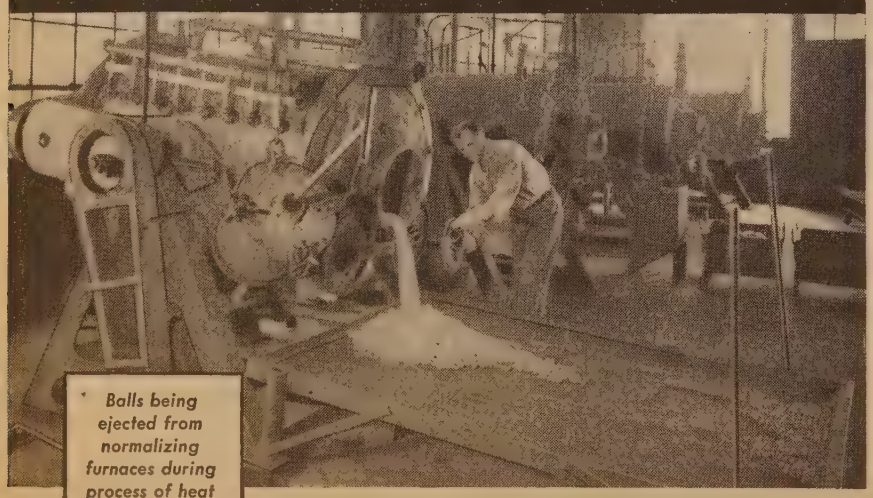


COSTS LESS THAN 6c PER SQUARE FT.

Here's hard-to-beat economy! Rubberlike, the modern composition floor runner with rugged corrugations protects all heavy traffic areas for less than 6c per square foot! Widely used in factories, offices, schools, hotels, cafes, institutions, it quiets footsteps — makes slippery floors safe. Skidproof even when wet. Easy to clean, Rubberlike runner needs no special upkeep, can be put down without cementing. Won't curl at edges. Amazingly durable — and doubly desirable because of its "petty-cash" cost! In rolls, 27 in. by 100 ft. or 36 in. by 75 ft. Order from supply house or write for sample. Bird & Son, inc., 150 Washington Street, East Walpole, Mass.

RUBBERLIKE* Runner
PATENTED NON-RUBBER CONSTRUCTION
BIRD NEPONSET PRODUCTS
*Reg. U. S. Pat. Off.
BIRD & SON, inc., EAST WALPOLE, MASS., NEW YORK, SHREVEPORT, LA., CHICAGO

STROM BALLS For The Bearings Of Industry



Balls being ejected from normalizing furnaces during process of heat treating.

Industry continually seeks to perfect the performance of its products. That means that all parts must be brought up to higher and higher standards. It is especially important that the balls on which the bearings of industry run shall be of the highest standard of perfection. Strom Balls, in their unbelievably high qualities of finish, sphericity and precision—developed through exclusive concentration on making fine balls for 25 years—hold first place in American industry. Strom Steel Ball Co., 1850 So. 54th Ave., Cicero 50, Ill.

Strom BALLS Serve Industry
LARGEST INDEPENDENT AND EXCLUSIVE METAL BALL MANUFACTURER

(Continued from page 240)

County Board of Public Welfare to give assistance to needy families of the unemployed strikers amounted to $40,700 at the end of eight months. An estimated cost of $15,000 was listed for vandalism damage to 76 homes and 224 automobiles of the non-striking employes. Lost wages amounted to $19,000,000. Company spokesmen estimated production losses as $17,000,000 for the first three quarters of 1946, with the fourth quarter not yet computed.

Milwaukee County will lose an estimated $64,021 in taxes and the State of Wisconsin will lose about $287,590.

● Unions Remove Bias Rules

Over 30 trade unions in New York State, reported to have a membership of 750,000, have eliminated discriminatory provisions in their constitutions and by-laws which had contained clauses limiting membership to white persons only or had accepted non-whites in auxiliary non-voting bodies only.

In reporting on progress in wiping out discrimination, Henry C. Turner, chairman of the New York State Commission Against Discrimination, pointed out that the New York State law against discrimination "defines it to be an unlawful employment practice for a labor organization to exclude or expel anyone from its membership because of race, creed, color or national origin" and prohibits "segregated auxiliary locals composed of minority group members." Most unions operating in New York have amended their constitutions and by-laws to remove discriminatory provisions.

The Brotherhood of Locomotive Engineers refused to agree to eliminate such provision from its laws and the situation may have to be met by legal action, Mr. Turner pointed out.

● Building Trade Workers' Wages Stabilized

An agreement between unions and employers whereby wages of 200,000 building trades workers in New York City have been stabilized in an effort to eliminate labor piracy and other troubles was effected early in January. Wage increases which bring earnings of almost all classes of skilled mechanics to $100 for a 40-hour week were granted, in return to the unions for renouncing their claim to double time for

(Continued on page 244)

Reg. U.S. Pat. Off.

UNBRAKO

The Knurling SAVES TIME

EVEN WITH OILY, GREASY HANDS

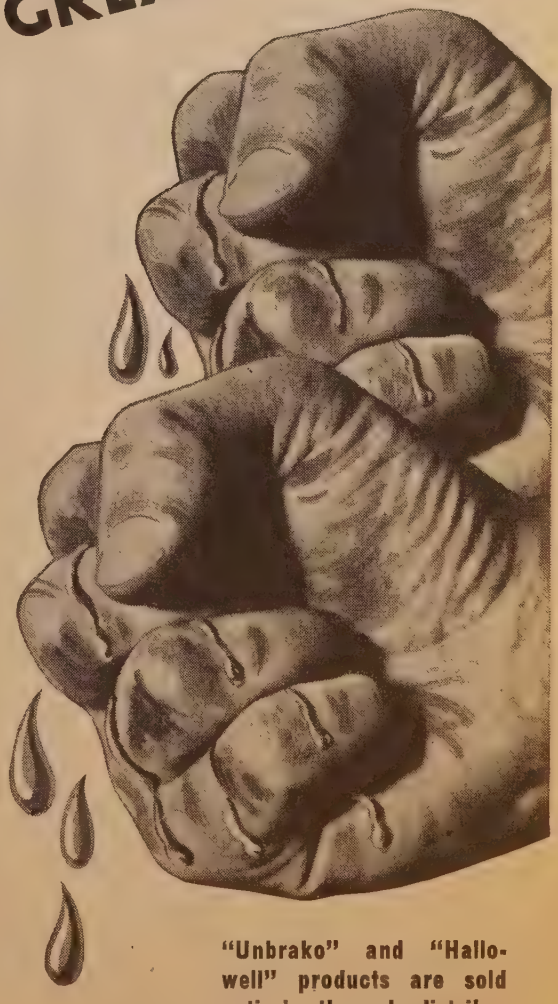
PAT. AND PAT. PEND.

The "Unbrako" Socket Head Cap Screw is a time-saver because the knurled head provides a slip- and fumble-proof grip—even for the oiliest and greasiest fingers. It can, therefore, be screwed-in faster and farther before it becomes necessary to use a wrench . . . assures a more compact, neater fastening with decided savings in material, space and cost.

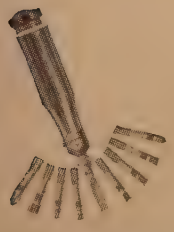
Self-Locking "Unbrako" Socket Set Screws—with knurled Cup-Point—hold fast because the knurled point digs in and stays tight, even under the most chattering vibration.

PAT. AND PAT. PEND.

"Unbrako" Socket Set Screws—with knurled threads—are also self-locking. They are for use where the point cannot be knurled. These and the Socket Head Cap Screws are available in sizes #4 to 1½". Write for your copy of our "Unbrako" Screw Products catalog.



Knurling of Socket Screws originated with "Unbrako" in 1934.



Kits: Pats. Pending

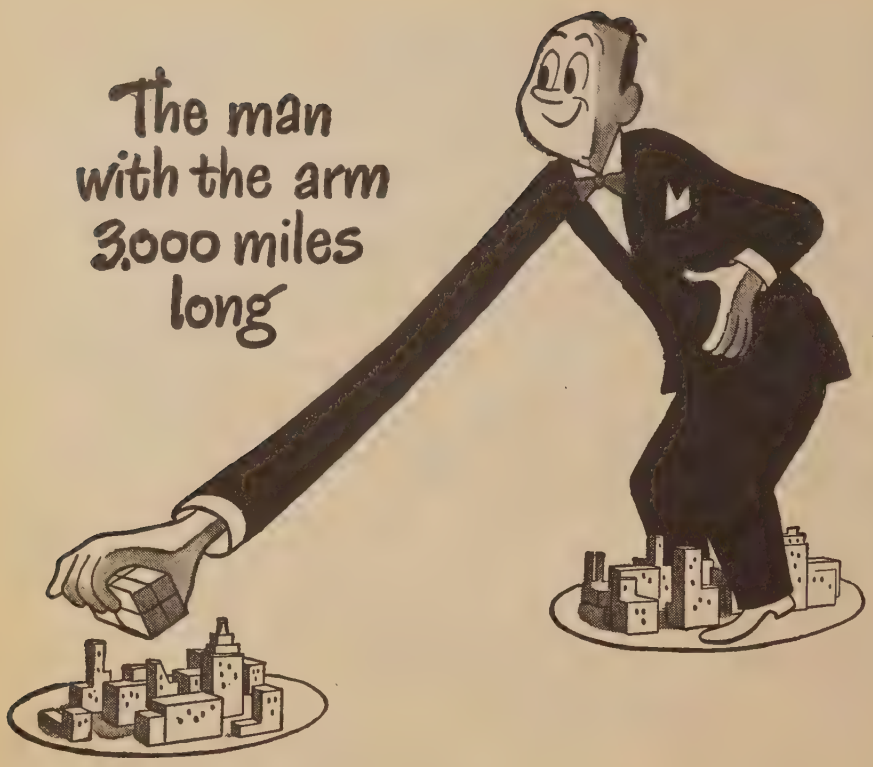
You can't screw socket screws in or out without a hex socket wrench—so why not get our No. 25 or No. 50 "Hallowell" Hollow Handle Key Kit which contains most all hex bits.

"Unbrako" and "Hallowell" products are sold entirely through distributors.

OVER 43 YEARS IN BUSINESS

STANDARD PRESSED STEEL CO.

JENKINTOWN, PENNA., BOX 520 • BRANCHES: BOSTON • CHICAGO • DETROIT • INDIANAPOLIS • ST. LOUIS • SAN FRANCISCO



In his business — just like yours these days — he is always running out of supplies and parts he needs in a hurry. Yet customers have to be satisfied.

Well, he doesn't have a nervous breakdown. He doesn't lose customers. Instead, he gets *what* he needs *when* he needs it by specifying Air Express delivery.

"Air Express," he said, "is like reaching out to any supplier's warehouse *wherever* it is — and picking up just what's wanted. Air Express puts the most distant suppliers *right next door.*"

Specify Air Express - it's Good Business

- Low rates. • Special pick-up and delivery at no extra cost.
- Direct by air to and from principal U. S. towns and cities.
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Just phone your local Air Express Division, Railway Express Agency, for fast shipping action . . . Write today for Air Express Rate Schedules containing helpful shipping aids. Address Air Express, 230 Park Avenue, New York 17, N. Y. Or ask for them at any Airline or Railway Express Office. Air Express Division, Railway Express Agency, representing the Airlines of the United States.

AIR EXPRESS

GETS THERE FIRST

Rates are low

To Air Express a 5 lb. package 1349 miles costs only $2.32! Heavier weights similarly inexpensive. Investigate!

(Continued from page 244)

the eighth hour of work. Overtime work at premium rates of pay is to be allowed only in emergency cases.

The agreement is expected to provide the impetus for new building construction in the city which has been held up by fear of many investors that overtime abuses would entail too great a risk for builders to calculate accurate potential costs and that there would be a runaway labor market. Participating in the agreement were 31 unions and 21 employer associations.

• 40% of Workers Insured

Twelve million or about 40% of the employes in private industry are protected by accident and health insurance, according to a survey conducted by the United States Chamber of Commerce's insurance department. The survey shows that 23,000 employers carried group insurance for 5,928,333 workers. Insurance for these employes pays an average of $17 per week, and about one-fiifth of the workers covered by such policies were paid benefits in 1945. The remainder of the twelve million are found to be protected through wage continuance plans, employe benefit associations and similar programs.

• Conference Board Report On Annual Wage Plans

An analysis of 61 wage and employment-guaranty plans made by the National Industrial Conference Board shows that companies which have successful annual wage plans have usually had a long history of harmonious labor relations.

This security plan has simply been another step in a liberal program of employe benefits and has been planned carefully, according to the board, which said, "the environment was favorable to the experiment."

Implicit employer-employe confidence and cooperation are vitally important to successful operation of an annual-wage plan, the board points out, adding that in depression periods when it may be necessary to restrict the plan's provision, there will be suspicion and unrest unless workers have confidence in management's motives.

"Even though a guaranty plan makes a valuable contribution to employee security, it probably will not attain its maximum effective-

(Continued on page 246)

ALOYCO Stainless Steel Valve Success Is Due to 2 Primary Factors

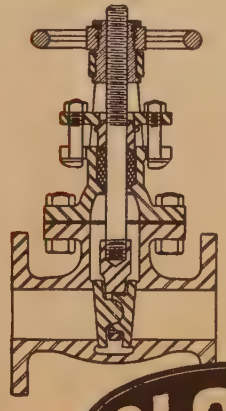
1. Wide Selection of Corrosion-Resisting Alloys
2. Excellence of Design and Construction

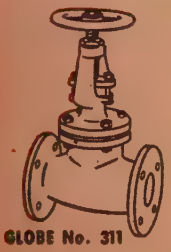
ALOYCO Valves and Fittings are made in a wide variety of stainless steels and other corrosion-resisting alloys. Each of these differs from all others in relative resistance to various corrosive fluids, under different conditions of temperature and concentration. It has taken us many years of specialization in the manufacture of corrosion-resisting valves, exclusively, to gain the experience which enables us to recommend the *one best alloy* for any specific application.

Of equal importance with the selection of the correct alloy, is the quality of design and construction of the valve. In pattern shop, foundry and machine shop, particularly, corrosion-resisting alloys require very different handling from all other metals. Here again, our concentration on corrosion problems makes Aloyco Valves distinctive for mechanical excellence. You get more out of Aloyco Valves, because we put more into them. Consult us on your requirements.

ALOYCO GATE VALVE NO. 111

This popular valve has double-disc, ball-and-socket type wedges that are free to rotate and are non-fouling in any position. The design insures tightness on both seats and permits easy repairs.



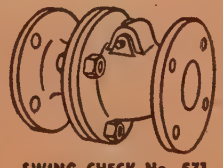


GLOBE No. 311

SERIES 300 GATE VALVE

ANGLE No. 331

GLOBE CHECK No. 45-A



SWING CHECK No. 571

FLUSH BOTTOM TANK No. 751

GLOBE No. 40-A

Y-FLANGED No. 361

ALOYCO

STAINLESS STEEL VALVES AND FITTINGS

GATE, GLOBE, Y, CHECK, TANK, SAMPLING AND V-PORT VALVES
SCREWED, FLANGED AND WELDING FITTINGS

ALLOY STEEL PRODUCTS COMPANY, INC.

1308 WEST ELIZABETH AVE. • LINDEN, N. J.

Each Forsberg Blade that carries the famous WHALE BRAND mark of quality is scientifically heat treated to add the toughness that gives these Blades their fine performance. They're gauged and checked throughout every step of their manufacture and given a stiff bending pounds test before you get them for use. The popular HY-FLEX Blade, shown above, meets today's demand for a medium priced blade which is extremely flexible, yet has the guts for solid service.

Here's a Whale of a Blade of a special analysis molybdenum, high speed steel that gives unusual cutting service. Can be used at the same cutting speeds as tungsten and deliver practically equal performance. If you want outstanding results on stubborn cutting jobs, ask your mill supply house for WHALE BRAND HY-FLEX and MO-HY BLADES and you'll get it.

Get to know the satisfaction in WHALE BRAND HACK SAW BLADES and FRAMES • BAND SAWS • COPING SAW FRAMES and BLADES • SCREW DRIVERS • HAND DRILLS • Ask for the catalog that describes these and other good FORSBERG TOOLS.

Forsberg

• MFG. CO., BRIDGEPORT, CONN., U.S.A.

(Continued from page 244)

ness unless the plan is thoroughly explained to the wage earners concerned," the board observed.

Half the plans studied had been discontinued, most of them after a five years' trial. Two are still in effect after 20 years. It was found that the reason for several of the plans being unsuccessful was only because they were announced to employes without preliminary discussion with employes.

• New York Strike Figures

Preliminary strike figures for New York State in 1946 showed that more workers were made idle and more production days lost than in any previous time in the history of the state.

There were 403,400 workers made idle, one-third more than in the 1933, the previous record year. Man-days lost in production and wages were 8,769,000, more than double the record high of 3,880,929 in 1933.

The number of strikes themselves did not set a record. There were 845 whereas in 1937 the number reached 897.

New York state's industrial organization is, however, so high that only nine-tenths of one per cent of the total estimated working time was lost. The greatest number of strikes in 1946 took place in the month of January.

• Union Officers Will Receive Pensions

A retirement fund for its own paid officers has been set up by the International Ladies Garment Workers Union, AFL. The union is seeking employer-financed pension plans for all its 350,000 members.

Benefits range up to 50% of the officers' regular salaries to be paid to men retiring at the age of 60 and women retiring at the age of 55. The union pays two-thirds of the cost and the beneficiaries contribute the remaining one-third.

Officers who are voted out of office or who leave voluntarily before reaching the retirement age will receive a full refund of their contributions to the pension. If they die in office, before retirement, a similar refund will be made to their families. In case of total disability resulting from accident or illness, the retirement allowance becomes payable at once with regard to age. First retirement payments will be

(Continued on page 248)

For Economy Use

NEATSLENE STICK BELT DRESSING

Contains Mutton Tallow
Made in Stick and Liquid

Sheps NEATSFOOT OILS

Made in Three Grades
PURE—PRIME—NO. 1
Sheps Neatsfoot Oils and Sheps Neatslene Harness Oils.
Best for leather in all kinds of weather.
Softens—Preserves All Leather

From the foot bones of beef animals processed in Omaha Packing Houses comes the Pure Neatsfoot Oil used in Sheps Neatfoot Oils.

See your Mill Supply Dealer or WRITE US for name of nearest dealer.

Manufactured by
Neatslene Co., Omaha 8, Nebr.
ROY W. SHEPARD. "SHEP"

Magnesium Castings Are Available Now

Often At Equal Or Less Cost

Because of their excellent machining qualities, magnesium castings often cost less than finished castings of other metals. We make Magnesium alloy castings of all sizes, from a fraction of an inch up to six feet in diameter for a variety of uses, including aircraft, textile machines, office equipment, scales, fish line manufacturing, vacuum cleaners and toys. Why not investigate the possibilities of using Magnesium?

Write for complete information to

UTICA RADIATOR CORPORATION
Magnesium and Aluminum Castings
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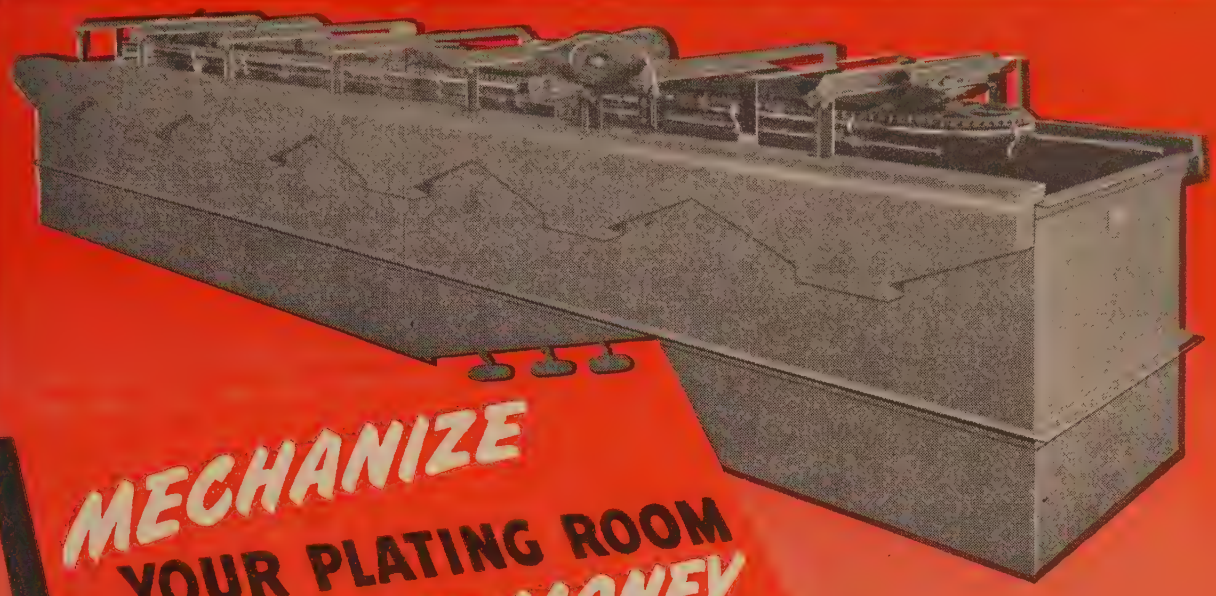


MECHANIZE YOUR PLATING ROOM AND SAVE MONEY

The Udylite Semiautomatic Plating Machine with one operator who merely loads and unloads the racks will turn out as much work in a given time as a battery of still tanks with a number of operators. And it doesn't require a skilled operator either.

Specifically here's what this machine will contribute to your plating operation.

1. Provides greater production.
2. Greater process control and therefore greater product uniformity.
3. Greater flexibility to meet emergencies.
4. Significant economies in man-hours, floor space, time and metal consumption.

The new bulletin just off the press will give you complete details. Write for your copy today.

2455

THE Udylite CORPORATION

1651 EAST GRAND BOULEVARD

DETROIT 11, MICHIGAN

REPRESENTATIVES IN ALL PRINCIPAL CITIES

FIRES ARE AS UNPREDICTABLE AS SUN SPOTS... BUT YOU CAN plan FIRE PROTECTION...

If fires could be forecasted, protection would be simple; the whole fire department could be on the spot, ready to put it out, but fires usually start suddenly, without warning. The first few moments after a fire is discovered are the crucial ones; a proper extinguisher used in time may save thousands of dollars in material and equipment loss and production delay.

Be sure when you check your fire equipment that each type risk is protected; it is dangerous to attempt to put out a fire with the wrong extinguisher—water spreads oil, gas and flammable liquid fires and ruins electric equipment. There is a Pyrene extinguisher for every hazard. Before you need it is the time to install adequate equipment. Let a Pyrene jobber or one of our engineers help you plan a complete protection system. Write today for information.

Pyrene

PYRENE V. L. PUMP TYPE

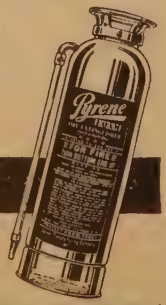
1 and 1½ quart sizes for homes, automobiles, small trucks and flammable liquids. Non-damaging, safe for electric equipment, handy and easy-to-operate.

PYRENE V. L. PRESSURE TYPE

2 quart and 1 gallon sizes for large trucks, diesel engines, electric equipment and gas, oil and flammable liquid fires. Harmless to generators, motors and wiring.

PYRENE WATER-TYPE

Operated by a gas cartridge. Refill only after use. No danger of acid burns. For protection of ordinary combustibles in stores, offices, factories and public buildings. Also Soda-Acid Type.



PYRENE FOAM EXTINGUISHER

Especially suited to gas, oil, paint and solvent fires. Also Air Foam Playpipes and Systems.

Pyrene Manufacturing Company
NEWARK 8 NEW JERSEY
Affiliated with C-O-Two Fire Equipment Co.

(Continued from page 246)

paid Jan. 1, 1949, according to David Dubinsky, president of the union. The program covers about 700 officers and each contributes 5% of his weekly pay to the fund. The local union contributes an amount equal to 7½%, and the international office gives the remaining 2%. The international office pays the full 10% for those on its own staff.

● St. Louis Strike Survey

A survey of AFL unions in St. Louis, conducted by John I. Rollings, executive of the Central Trades & Labor Union, AFL, in that city, showed that of 10,117 contracts signed in the 12-month period following V-J Day, only 448 or 4.4% were preceded by walkouts.

The survey was made to discover how many contracts had been negotiated in that period without strikes or loss of working time. Of the 103,188 workers involved, 10,323 or 9.1% had gone on strike. The survey was based on replies from 222 of the 318 locals receiving questionnaires. No answers were made by 56 locals comprised of railroad workers whose strike action is limited by the Railway Labor Act.

● Materials Handling Meeting

"Handling Materials Through Manufacturing Operations on Conveyor Systems" was the subject discussed at the morning meeting of the Materials Handling Division of the American Society of Mechanical Engineers at the 67th annual meeting of the Society. The paper was presented by W. D. Ligon, works manager, T. C. Fockler, assistant works manager, and A. E. Goodwin, superintendent of equipment and plant layout, Westinghouse Electric Corp., Buffalo, N. Y. The meeting took place in New York.

The new Buffalo plant of the Motor Division of Westinghouse is said to be the "last word in factories." With its 30 acres under one roof and 2,155,004 square feet of overall floor area, this plant is especially designed for mass production. Floor areas are wide span and column free to permit the effective use of straight line flow of production. Modern materials handling equipment is used throughout.

Raw materials come to the plant by railway siding or by truck to the landing docks. Materials are then moved by tractor truck or crane to

(Continued on page 250)

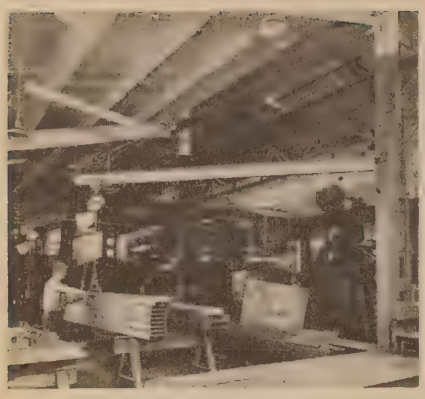
Compare

THE LOW PRICE OF CARBOLOY STANDARDS WITH ORDINARY TOOLS!

Surprising, but true!—the price of Standard Carboloy Tools is actually lower than steel tools in sizes ¾" sq. and larger, and but a few cents more in smaller sizes. Check these typical prices of a Style T-4 Turning Tool against your ordinary tool cost: 5/16" sq.—84c, ⅜" sq.—90c, 7/16" sq.—$1.32.

Yet—bear in mind, at prices this low—*you get a whale of an improvement in performance!*

Investigate Standard Carboloy Tools for *your* plant. Write for Catalog GT-175R. Carboloy Company, Inc., 11137 E. 8 Mile Ave., Detroit 32, Michigan.



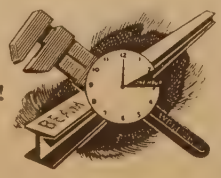
Would a crane help?

Do you have places in your plant where production is held up while the men wait for the big crane to come and lift or move machines, machine parts, or their heavy tools for them? If so, a crane built with a 'Budgit' Crane Assembly will eliminate that condition.

'Budgit' Crane Assemblies provide you with the simplest, most economical way of acquiring a swinging bracket jib crane or both top-running and underhung push type and geared type bridge cranes. Each crane assembly contains everything needed to build a crane with the exception of the I-Beam or I-Beam and Shaft which you buy locally to save transportation costs. Each crane contains an instruction book for assembling it and instructions and diagrams are so simple that any workman can install the crane. All he needs is a wrench and — one hour's time! Your crane is then ready to go to work.

ALL THAT IS NEEDED . . .

ONE MAN!
ONE WRENCH!
ONE HOUR!



Send for a copy of Bulletin No. 374 for more information on 'Budgit' Crane Assemblies.

MAXWELL MANNING & MOORE INC. MM&M TRADE MARK

'BUDGIT'
Crane Assemblies

MANNING, MAXWELL & MOORE, INC.
MUSKEGON, MICHIGAN

Builders of 'Shaw-Box' Cranes, 'Budgit' and 'Load Lifter' Hoists and other lifting specialties. Makers of Ashcroft Gauges, Hancock Valves, Consolidated Safety and Relief Valves and 'American' industrial instruments.

(Continued from page 248)

the three basic sub-assembly lines—stator, rotor and bracket. Both straight line and cross flow of goods are employed to advantage.

Rotors, for example travel on overhead conveyors, then on pallets along a roller conveyor line. As they pass through the oven, the rotors are suspended from overhead conveyors for the most part. A carrousel system, however is to be used. They also pass through their ovens suspended from overhead conveyors.

Brackets travel on hooks along an overhead system. They are taken off the hooks for painting and machining after which they are moved by gravity roller conveyors.

The stators and rotors are assembled on roller conveyors with the brackets coming in at the end of the line.

Power-type conveyors carry the finished motors to the shipping dock.

Lamination sheets, which are 32 x 72 in. in size, are handled by a sheet lifter and crane. Cranes carry them to the first work station where they are stripped. From there they go by an inclined belt conveyor to the next operation, from which they are ejected and conveyed to stacking boxes.

Scrap is handled on a trough belt.

● Heads ASME Branch

Arthur B. Studley, assistant manager of the Boston district office of SKF Industries, Inc., has been elected chairman of the Textile Division of the American Society of Mechanical Engineers. He succeeds Carl D. Brown, of The Draper Corp. Mr. Studley, who joined the Philadelphia ball and roller bearing firm in 1922, served as secretary of the textile division in 1944-45 and as vice chairman last year. The division has a membership of 535 textile industry representatives.

● AISE Officers

L. R. Milburn, electrical engineer, Great Lakes Steel Corp., Ecorse, Mich., has been elected president of the Association of Iron and Steel Engineers for 1947.

As president of the AISE for 1947, Mr. Milburn will help the association celebrate its 40th year of service to the nation's iron and steel industry. Founded in 1907 as a means of fostering the exchange of ideas and furthering the electrification of the iron and steel industry,

(Continued on page 252)

A Magical DIRT *and* GREASE *Remover* FOR YOUR

WASHROOMS

WALLS AND WOODWORK

FACTORY FLOORS

For Every Factory Cleaning Job In

ELEKTRO-PURJ-IT *All Purpose* **CLEANING COMPOUND**

DISSOLVES IN WATER . . .

Costs Less Than 2c per Gallon

The proven choice of many as the better, faster CLEANER. Saves labor! Cuts cleaning costs! Added to water makes the proper strength solution for each cleaning job requirement. It's dustless, non-caking—deodorizes, freshens. Gentle for hands, surfaces. Ends need for dangerous fluids.

FREE SAMPLE
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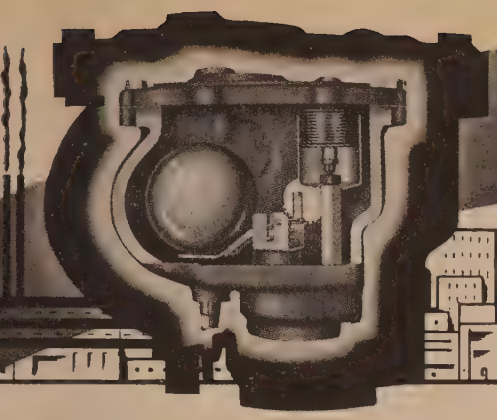


HOW A TRAP SOLVED A PROBLEM IN PAINTING

TRANE FURNISHED A STEAM TRAP TO HELP THE MAKERS OF AUTOMOBILES

Above: Twelve Class 200 Industrial Float Traps, connected to high pressure steam heating coils in paint drying ovens in the Ford Rouge Plant. *Left:* Cutaway view of the Trane Class 200 Industrial Steam Trap, which Trane furnishes the Ford Motor Company.

n many automotive production processes, for example, in the ovens where enamel is baked on utomobile bodies, high heats must be held within xtremely close limits to assure uniform results. hese high heats are often obtained with high ressure steam. However, ordinary steam traps dis- harge air and condensate intermittently—making t difficult to hold unvarying temperatures.

To solve this problem, the Ford Motor Company alled on Trane for a trap that would maintain igh temperatures without fluctuation. Trane Class 00 Industrial Traps were furnished. These traps ermit a continuous discharge of condensate and ent air out of the heating coils, thus making it pos- ible to hold the constant high temperatures needed.

The Class 200 Industrial Trap was so satisfactory that the Ford Motor Company promptly put it to work in several entirely new applications—among them, in a large paper drying machine and in large blast coils in several Ford plants. This trap is another example of the ingenuity of the men who design and build the complete line of Trane matched products—products that are designed and built together for use together. See other Trane products in the panel at the right.

More than 200 Trane Field Engineers in principal cities all over the country co-operate with architects, engineers, and contractors in the application of Trane products and systems—the utilization of Trane Weather Magic.

ALLEN TRU-GROUND

DOWEL PINS

support accurate tool and die work

They serve as locating pins for the diemaker's work — and then go on to general duty as pins and pivots in various machine assemblies. By their accuracy and strength they *retain* precision standards in tool and die assemblies under punishing stresses.

They are ground to a limit of .0002" over basic size, with an allowable tolerance of plus or minus .0001". Surfaces are finely polished; subsequently treated with a rust-preventive.

Metallurgically in a class with ALLEN Hex-socket Screws: — made of the same special-analysis *ALLENOY* steel, heat-treated to an extremely hard surface, with a core of the right toughness to prevent "mushrooming" when driven into a tight hole... Tensile strength, 240,000 to 250,000 lbs. per sq. inch... Typically the Allen high safety-factor in HOLDING-POWER.

Ask your local ALLEN Distributor for samples and dimensional data... the same Distributor who serves you dependably with Allen Hex-socket Screws and other first-call mill supply lines.

TRADE A MARK

THE ALLEN MANUFACTURING COMPANY
HARTFORD 1, - - CONNECTICUT, U. S. A.

(Continued from page 250)

the association has enjoyed a healthy growth and has greatly amplified the scope of its activities, now embracing all the various divisions of steel plant engineering and operation. Engineering divisions now functioning within the association include the electrical, mechanical, fuel and power, lubrication, welding, operating practice and rolling mill fields.

A. J. Fisher, fuel engineer, Bethlehem Steel Co., Sparrows Point, Md., is first vice president; C. H. Williams, chief engineer, Pittsburgh district, Carnegie-Illinois Steel Corp., second vice president; A. S. Glossbrenner, assistant vice president in charge of operations, Youngstown Sheet and Tube Co., treasurer; and John F. Black, assistant works manager, Atlas Steels, Ltd., Welland, Ontario, Canada, secretary.

● Packaging Contest

The Industrial Packaging Engineers Association has announced its first annual Protective Packaging Contest to be held in conjunction with the association's second annual industrial packaging and materials handling exposition April 29 through May 1 at the Sherman Hotel, Chicago, Ill. First prize will be a $100 award; second, $50, and third, $25.

Awards will be based on the following factors: safety; conformance to carrier requirements; ingenuity; ease of handling, and economy. I. J. Stoller, vice president of Bradner Smith & Co., is chairman of the contest.

● Standards for Materials

Acting through the Administrative Committee on Standards, the American Society for Testing Materials has approved quite a number of new and revised specifications and test methods. The accompanying table lists those acted on in the late fall, the dates of approval of the respective items being indicated. It will be noted that the recommendations for these various standardization developments come from technical committees covering a rather wide range of materials. All of the new and revised tentatives are included in the 1946 Book of A.S.T.M. Standards, and the specifications and tests are available in separate pamphlet form.

The new Tentative Specification covering Fire-Refined Copper for Wrought Alloys (B 216) essentially

(Continued on page 255)

(Continued from page 252)

replaces the Emergency Specification ES-7 developed as a wartime measure and widely used to cover a large variety of applications. The types of copper covered, largely the so-called Braden type from South America, and the Morenci type from Southwestern United States, are considered quite suitable for most applications with the notable exception of uses where electrical conductivity calls for a very high purity material. The permissible noncopper elements in the requirements on chemical composition for fire-refined copper are such that the material is not the best available to conduct electricity.

Two other important recommendations from A.S.T.M. Committees, B-2 on Non-Ferrous Metals and Alloys involve a new Tentative Specification for Soft Solder Metal (B 32) which replaces the former specification carrying the designation B 32-40 T, and a significant new Tentative for White Metal-Bearing Alloys (known commercially as Babbitt metal) which also will replace the current standard B 23 which has not been revised in twenty years.

The new Solder Specification embodies a number of improvements in arrangement of the specification, incorporates an interesting new system of nomenclature, and essentially will channel the grades into the more widely used commercial alloys. The new grade classification symbol uses numerals to indicate the nominal percentage of tin, followed by the letter A, B, or C indicating the general grading of purity of the solder, A being the highest type, B next in line, and the C grade having a specified antimony content. Some 28 grades of tin lead, tin lead antimony, and silver lead alloys are covered.

The new Babbitt Specification B 23-46 T cover 14 typical Babbitt metals including a number of newer lead-base alloys and others comprising some of the more satisfactory compositions that formerly were covered in emergency requirements for wartime use.

Aluminum and Magnesium

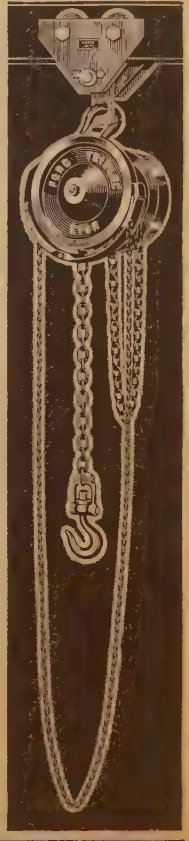
During the year Committee B-7 on Light Metals and Alloys, Cast and Wrought, covering largely aluminum and magnesium and their alloys, has given its numerous specifications very exhaustive study, and in addition to the several actions noted below, there were many reported at the society's annual meet-

(Continued on page 256)

do you have a

HANDLING PROBLEM?

...use FORD TRIBLOCS



"Handling Problems" do not necessarily mean trouble. In thousands of busy shops FORD Chain Hoists and Trolleys are making little jobs out of big ones. They're easy to use—hard to wear out. That's because they're designed with few moving parts, built to take punishment. Whether it's for once-in-a-while or for all-day-every-day use—choose FORD. Capacities 250 pounds to 40 tons.

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Axial Relief
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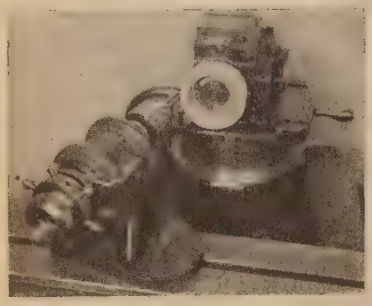

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HERE'S a fixture that will save you the expense of buying special duty machines for such work as grinding cutting edges, steps, flutes and chip relief on milling cutters, burring tools, counterbores, countersinks, end mills, reamers, drills and taps.

All adjustments simple, visual and external. Instantly adjusted to right or left hand. Axial relief automatically equalized on all flutes. Can be used on surface grinders as well as cutter grinders. Performs most jobs with standard grinding wheels.

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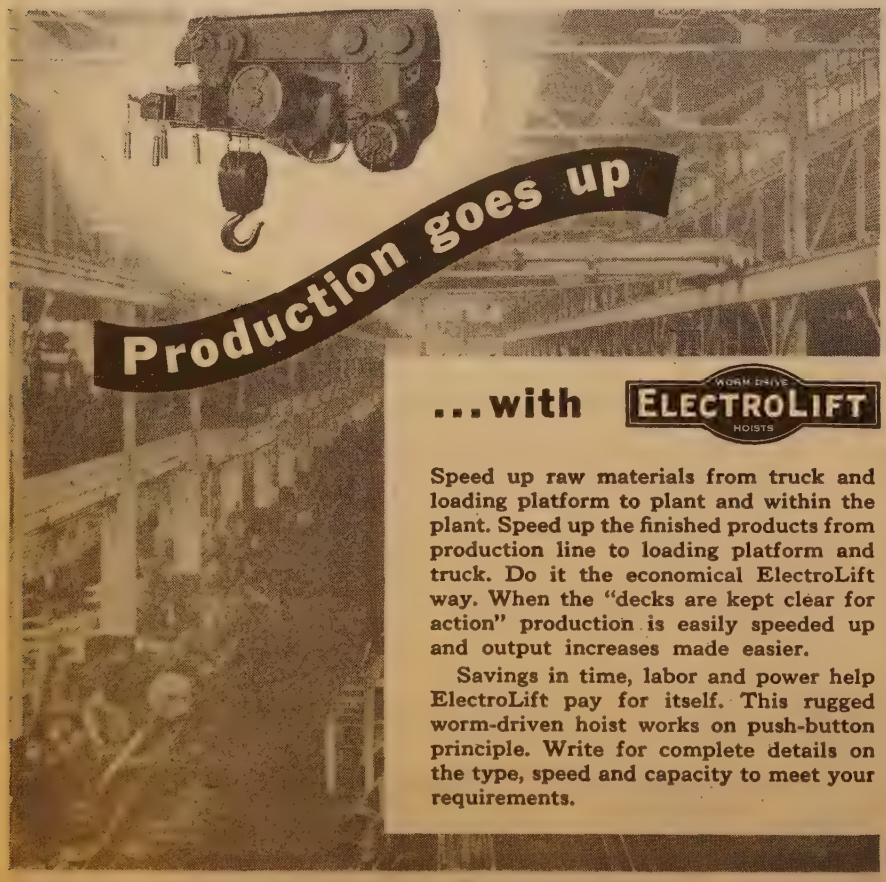


...with ELECTROLIFT WORM DRIVE HOISTS

Speed up raw materials from truck and loading platform to plant and within the plant. Speed up the finished products from production line to loading platform and truck. Do it the economical ElectroLift way. When the "decks are kept clear for action" production is easily speeded up and output increases made easier.

Savings in time, labor and power help ElectroLift pay for itself. This rugged worm-driven hoist works on push-button principle. Write for complete details on the type, speed and capacity to meet your requirements.

ELECTROLIFT, INC. • 30 Church Street, New York 7, N. Y.

(Continued from page 255)

ing in June. While in general all of the new and revised specifications bring them currently in line with commercial practice, some significant points are worth noting. The new tentative requirements for Aluminum-Base Alloys in Ingot Form for Use in Manufacturing Castings (B 179) essentially consolidate and replace three former specifications (B 58, B 112, and B 125). The same form and essentially the same wording are used as in the now obsolete specifications, but some clarifying editorial changes have been made. Some 26 alloys are covered.

The revisions in the Sheet Specifications (B 209 and B 90) correct certain errors made in earlier drafts of the specifications and in the case of the magnesium material, Alloy AZ61X, which is no longer commercially available, is being cancelled.

The requirements for Aluminum for Use in Iron and Steel Manufacture (B 37) will now cover five grades of material ranging from 85 to 98 + % aluminum. Requirements are given on permissible copper, zinc, and magnesium, and the sum of the total of impurities. The modified requirements for Aluminum-Base. Alloy Sand Castings (B 26) not only incorporate numerous changes in chemical composition but also embody four new alloys. Explanatory notes are added indicating particular properties and characteristics of these.

Stainless Welding Electrodes

Developed in the joint American Welding Society-A.S.T.M. Committee on Filler Metal, the new specifications for corrosion-resistant chromium and chromium-nickel steel electrodes A 298-46 T have been in course of promulgation since 1940, when the subcommittee was first organized. A rather complete draft was issued about a year ago and has since been carefully considered and revised. The arrangement of the specifications and the general method of handling the requirements are patterned after the existing standard on iron and and steel arc-welding electrodes, A 233. The test requirements set up minimum quality levels which will assure suitability for the usual applications. A guide to the specifications is appended which is intended to aid in a proper evaluation and use of the six series which are covered.

The two new methods covering Determination of Sulfur in Lubri-

(Continued on page 258)

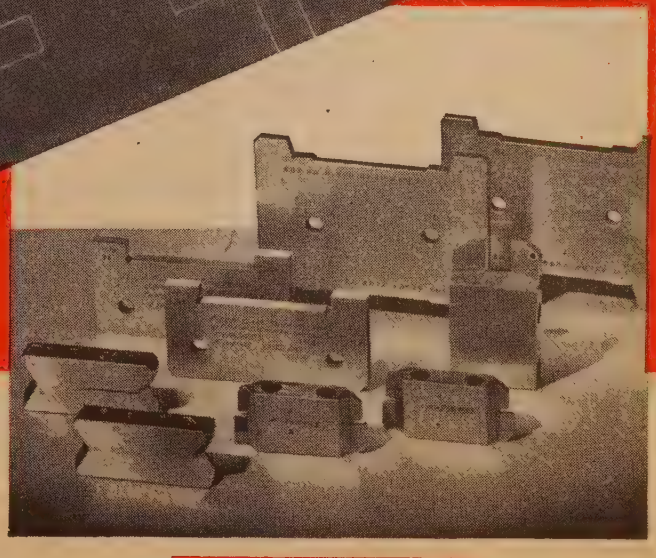
Get SMOOTH SURFACES for Accurate Layout Work

...USE

SIMONDS

"RED STREAK" Precision-Finished

FLAT GROUND STOCK



MAKE YOUR OWN GAUGES, dies, jigs, templates, stamps, shims, machine parts and small tools . . . with Simonds Oil Hardening Flat Stock, made of Simonds own alloy tool steel, uniformly annealed for easy machining and proper hardening.

SAVE TIME AND MONEY with this Flat Stock which is cut to 18″ length and accurately ground to standard thicknesses and widths. *No need for the expensive machining required to grind ordinary stock to size.*

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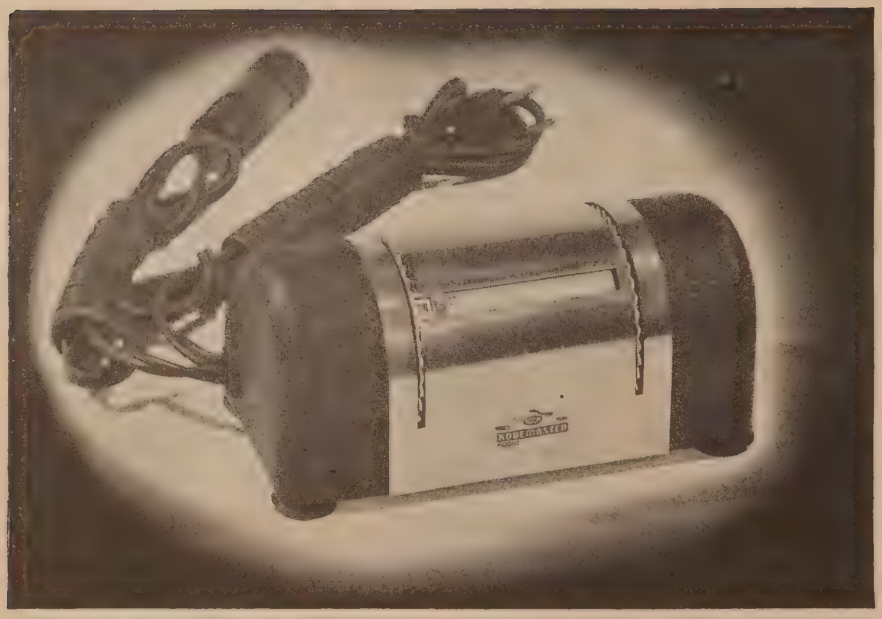
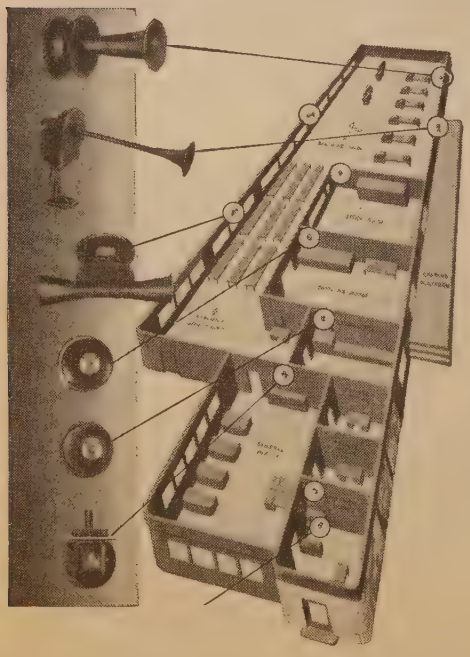


FARADAY KODEMASTER

Gets the right man in a jiffy!



A long distance call—an important conference—can't wait for the operator to telephone all around the plant. Time is valuable—too expensive to waste! Kodemaster will get the right man in a jiffy—only a few seconds and its message reaches every nook and corner of the plant and the man is located.

Every factory large enough for a telephone switchboard needs the efficient Faraday Kodemaster. It's the ideal system for locating individuals in a hurry—up to 30 different code signals.

Kodemaster is a unique, compact, fool-proof control for *old* or *new* signal systems. May be set up with any number or combination of bells, buzzers, horns, Kodaires, chimes, sirens.

For time-saving signaling, and low installation and maintenance cost, install Faraday Kodemaster. Can be installed by any competent electrician.

FARADAY UNIPACT units are interchangeable, "as easy as plugging in a toaster."

At your electrical distributor's

FARADAY
ELECTRIC CORPORATION
Adrian, Michigan

(Continued from page 256)

cating Oils which Contain Additives (D 894) and the Test for Normal Pentane and Benzene Insolubles in Used Lubricating Oils (D 893) have been under consideration for some time in Committee D-2, the sulfur method having been published for information in the 1946 Report, whereas the method pertaining to used lubricating oils was issued as an Emergency Standard (ES 42) in 1944, having been withdrawn in March of this year.

The new Sulfur Method (D 894) is intended for both new and used lubricating oils which have additives. The sample is oxidized by combustion in a bomb containing oxygen, under pressure. The sulfur, as sulfate in the bomb washings, is determined gravimetrically as barium sulfate.

STRIKES
Dec. 1 to Jan. 1

Oil Workers, CIO—Chelsea and Cambridge, Mass., plants of American Oil Co. Protest against company's delay in granting new contract; 150 strikers.

AFL—General strike in Oakland, Calif. Result from incident when police convoyed non-union merchandise trucks through picket lines before two Oakland stores where AFL Clerks Union sought a contract.

United Mine Workers, AFL — United States Government as operators of coal mines.

American Newspaper Guild, CIO —Camden Courier-Post newspapers, Philadelphia, Pa. Wage dispute.

UAW, CIO—Allis-Chalmers Co. Milwaukee, Wis. Demand for wage increase, union shop, and control of grievance procedure.

Longshoremen's Association — Inland Waterways Corp., operator for Government barge line on Mississippi River. 21 workers in 3-day work stoppage protesting long negotiations over pay increases and other subjects.

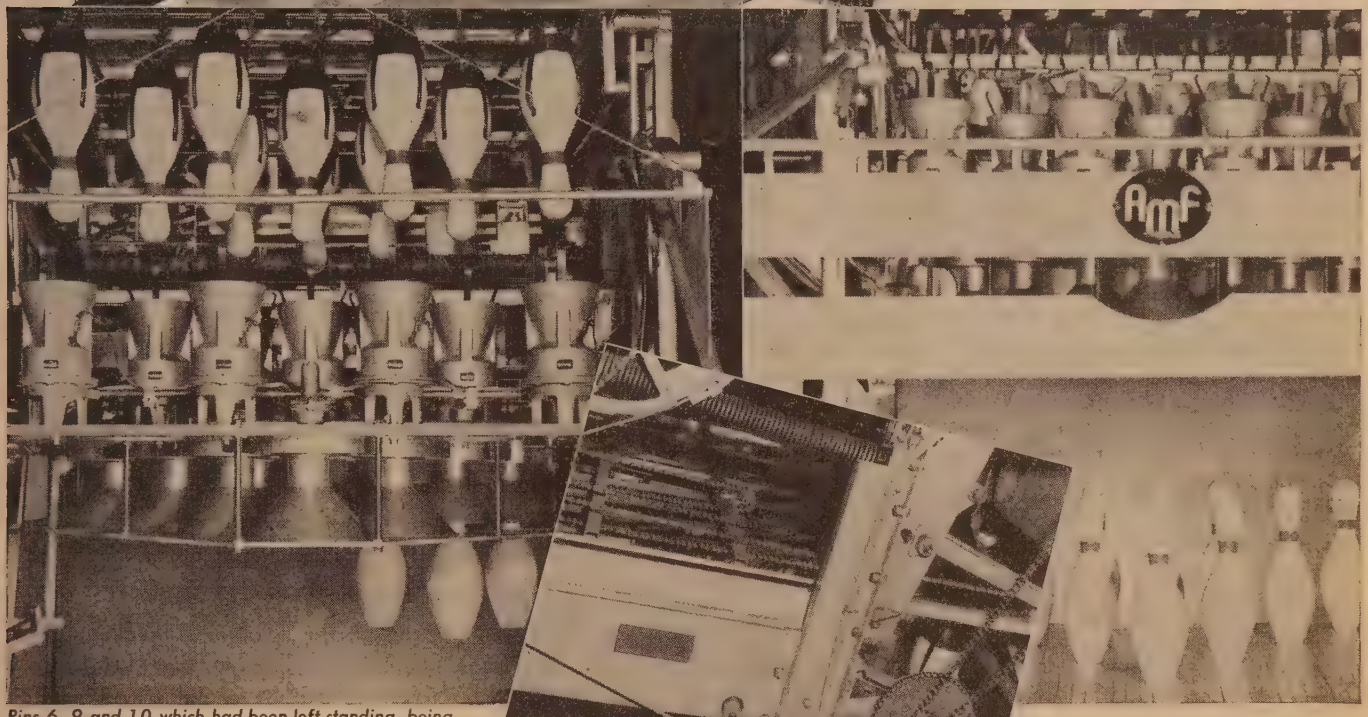
Las Vegas Editorial Assn., AFL —The Las Vegas Evening Review Journal, Las Vegas, Nev. Closed shop demands; nine strikers.

Brewery Workers, CIO — C. Schmidt & Sons, Philadelphia, Pa. Refusal of CIO men to stack beer on loading platforms for AFL drivers.

American Newspaper Guild, CIO —Philadelphia Record, newspaper, Philadelphia, Pa.

(Continued on page 260)

It's Done with Roller Chains



Pins 6, 9 and 10 which had been left standing, being reset to allow bowler to try second ball for a spare.

At left: Some of the Diamond Roller Chains in the Pin Spotter.

Automatic Pin Spotting Machine Does the Job Better

● Bowling enthusiasts and alley operators are well aware of Pin Boy troubles and shortages. The AMF Automatic Pin Spotter, approved by the American Bowling Congress, eliminates these troubles. It sets the pins—resets those left after the first ball has been rolled, *exactly* on spot or offspot in readiness for the try for a spare. Then all pins are set for the next frame.

This ingenious machine, requires many motions coordinated, perfectly timed and kept in exact relationship. To help accomplish this, a very substantial footage of roller chains and scores of sprockets were engineered into the design—for transmitting power, for conveying, for timing and for positioning.

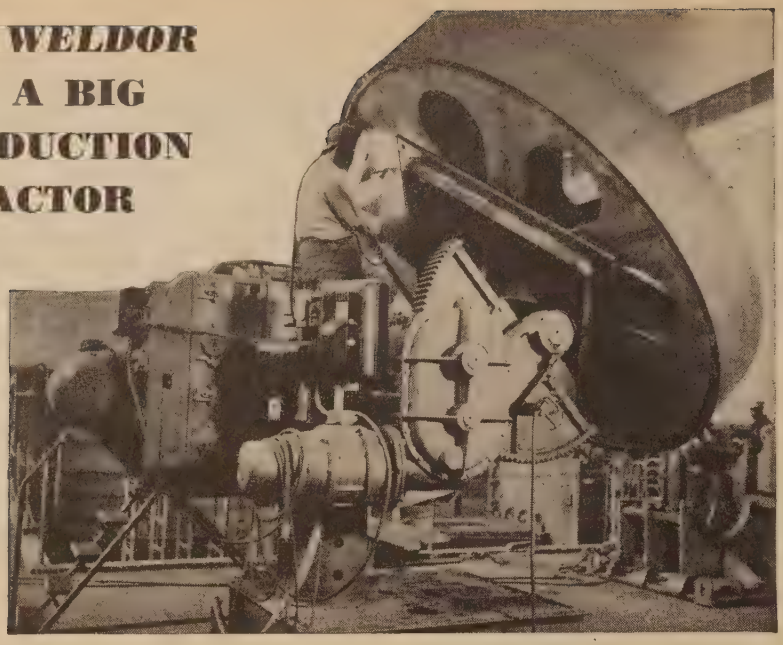
For original developments like this machine, the true uniformity of Diamond Roller Chains assures the necessary compactness, reliability, precision and accuracy of every motion, and identical operation of sets of units running in parallel. Roller chains cannot slip. They transfer power equally well and precisely with sprockets placed close together or far apart, allowing great latitude to the designer in the placement of shafts. Both sides of roller chain are alike, to run over or under sprockets.

These characteristics of Diamond Roller Chains are well known to American Machine and Foundry Co. engineers, long-time users of Diamond Chains on many other products.

If you are planning original developments, model changes or improvements, practical recommendations by Diamond Chain engineers can help save your time. DIAMOND CHAIN COMPANY, Inc., Dept. 415, 402 Kentucky Avenue, Indianapolis 7, Indiana Offices and Distributors in All Principal Cities.

DIAMOND **ROLLER CHAINS**

THE WELDOR IS A BIG PRODUCTION FACTOR



Your welders are *big* production factors when they work with C-F Welding Positioners because these power operated Positioners with variable speed table rotation are real production tools. Better automatic welding is possible because the C-F Variable Speed feature governs table rotation speed from 0 r.p.m. and up—assuring better control of fillet in circular or peripheral automatic welding.

If increased production, better downhand welding and lower costs in your welding department can help you meet the competition for new markets. C-F hand and/or power operated welding positioners should be your first choice. Write for Bulletin WP 22.

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MOLYBDENUM HIGH SPEED STEEL

Your Best Buy for Production Metal Sawing

GRIFFIN SPECIAL ALLOY Molybdenum High Speed Steel Blades of tough, specially Griffin-tempered steel, are a most economical buy, for they often out-cut ordinary tungsten steel blades eight to ten times. Uniform raker-set teeth that *bite*. Power machine and hand frame sizes.

OTHER GRIFFIN BEST BUY BLADES

Griffin Tungsten High Speed Steel Blades, for cutting very toughest alloys . . . Improved New Griffin hand saw blades, flexible as a soft-back, tough as an all-hard . . . Griffin Non-Strip, teeth do not break out when sawing thinnest sheet or tubing—hand frame sizes . . . Write for new 20-page Griffin Price List.

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Hack Saw Blades

MADE BY G. W. GRIFFIN CO., FRANKLIN, N. H.

Hack and Coping Saw Blade Specialists Since 1880

(Continued from page 258)

Teamsters & Chauffeurs, AFL — Five St. Louis trucking firms. Wildcat strike protesting suspension by union of union steward; 200 strikers.

Washington Telephone Traffic Union—The Chesapeake & Potomac Telephone Co., Washington, D. C. Complaint against three non-union operators; 700-800 strikers.

Retail, Wholesale & Department Store Employes, CIO — Safeway Stores, Inc., New York City, Westchester, Nassau, Suffolk and Rockland counties in New York. Dispute over contract negotiations; 900 strikers.

Steamfitters & Helpers, AFL — Public Service Electric & Gas Co., two gas-generating plants at Jersey City, N. J., and Piscataway Township. Protest against management's failure to sign new contract; 265 strikers.

UAW, CIO—J. I. Case Co., Racine, Wis. Main plant and tractor plant.

UAW, CIO—Long Manufacturing Div. of Borg-Warner Corp., Detroit, Mich. Wage demands. Strike settled after 5 months.

Among other companies hit by strikes: Commonwealth Industries, Nilson Tool & Mfg. Co., Cummings Optical Co. Schulte Optical Co., and Robison-Phillips Corp., all of Detroit; four newspapers in Springfield, Mass.

International Typographical Union, AFL—Two daily newspapers of the Gannett group, Rochester, N. Y. Wage demands.

Conference of Studio Unions — Motion Picture Studios, Hollywood, Calif. Jurisdictional fight between International Alliance of Theatrical Stage Employes and Conference of Studio Unions, several weeks old, and additional issues of contract and wage demands.

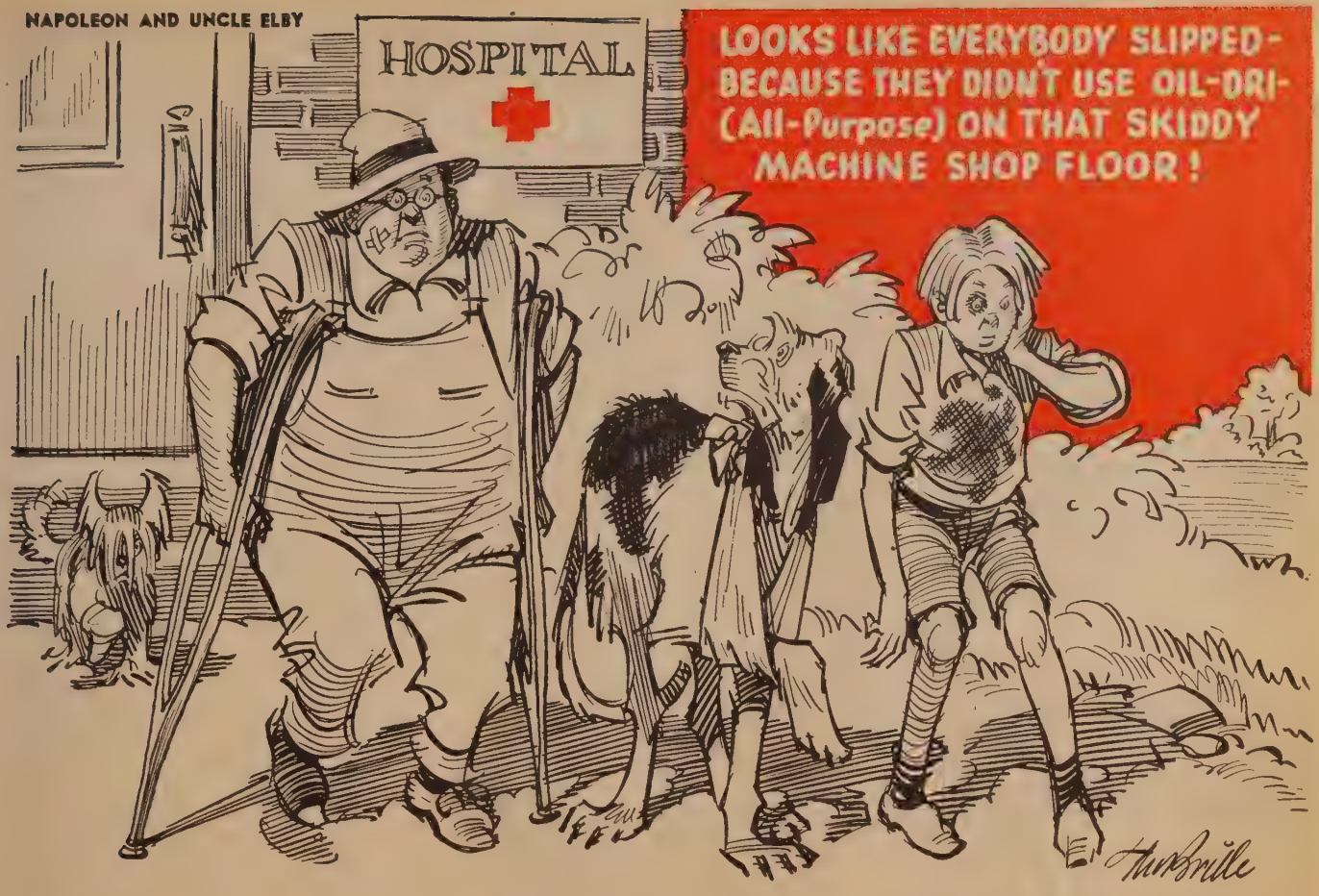
• Pump Design Innovations

A 10% efficiency increase and elimination of hydraulic losses are the purposes of new pump design which entails streamlining the inner mechanism of turbine pumps by introducing changes in the guide vanes. The purpose of the guide vane changes is to alter the flow direction of fluids being pumped, changing it from horizontal to vertical.

Heretofore the guide vanes have been constructed as thin as possible on the advance edge on the theory that the less metal the fluid strikes, the less will be the resistance en-

(Continued on page 262)

NAPOLEON AND UNCLE ELBY



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Absorbs all types of oils, greases and fats, plus water and soluble oil solutions. Keeps floors dry and free from oil and grease accumulations and oil-and-water slicks.

Use OIL-DRI-(All-Purpose) . . . the modern method of absorbing oil and grease accumulations from floors around equipment, in aisles, grease pits, steps or stairways, automotive repair shops, industrial machine shops, driveways, service stations, etc. Oil covered or soaked floors cause costly slipping accidents and are a constant fire hazard too.

OIL-DRI-(All-Purpose) will keep maintenance costs down and reduce insurance penalties. Recommended by insurance companies. Used by America's largest industrial corporations and automotive dealers . . . Don't put off putting it on.

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(Continued from page 260)

counter. According to the American Chemical Society, engineers have discovered that the thin edges allow water to cross the vanes at various angles, thus allowing miniature whirlpools and back currents to form within the pump and reduce its efficiency. The new design is an enlarged, bulb-shaped edge on a curving vane which causes the flow direction of the fluid to be always substantially tangential to the vane surface, regardless of how the stream strikes the edge. Flow pattern uniformity is, accordingly, achieved.

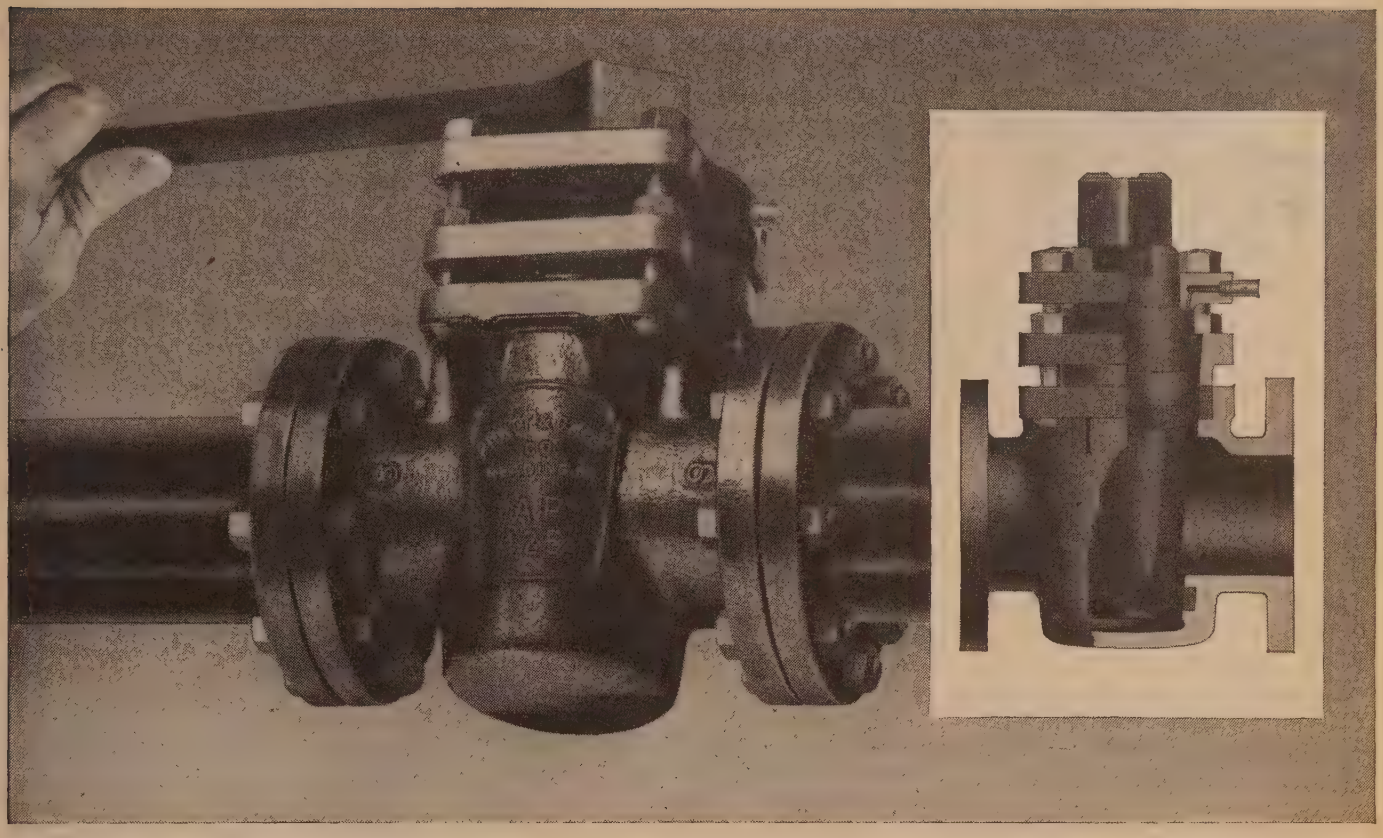
● Proper Diet for Workers

Proper diet can help to protect workers from industrial illness, medical investigation indicates, according to the Safety Research Institute, New York City. Industry handles many materials, including metals, solvents, and nitrated and chlorinated chemicals, which may, if carelessly used, affect the liver, kidneys, blood and other organs of the body. Safe working conditions are the primary means of protection from illness, but illness is much less likely to occur among workers whose diet is adequate in proteins, minerals and vitamins, the Institute points out.

The protective value of a balanced diet may be seen from the following incident. An outbreak of illness occurred among a group of women handling an organic solvent. Those who became ill had been living on a diet high in fat and containing little protein and few minerals; those who remained unaffected had been eating a more balanced diet.

(Continued on page 264)

"Having a little trouble tearing yourself away from the old bed these cold winter mornings?"



EASIER WORKING, LONGER LASTING READING-PRATT & CADY A. P. COCKS

Asbestos-Packed Cocks serve best as a shut-off on lines that carry solids in suspension, viscous fluids, oils, etc.,—in short, where Globe, Angle or Gate valves fail or where conventional ground plug cocks prove unsatisfactory. R-P & C A. P. Cocks are made in cast iron, bronze and cast steel.

READING, PA.—U-shaped grooves in the body of this cock are packed solidly with asbestos, which is then vulcanized. This provides a bearing surface which absorbs expansion and results in easier operation by avoiding the friction of metal-to-metal contact.

Double Gland Feature

This feature shown in the illustration, results in easier operation and longer life than the Single Gland Asbestos Packed Cock. With it the plug is not jammed down unnecessarily by putting appropriate pressure on the top packing.

Other R-P & C Products

Reading-Pratt & Cady offers you a single responsible source for bronze, iron and steel globe, angle and check valves—Lubrotite gate valves—Bar Stock valves—cast steel fittings.

R-P & C distributors are located in principal cities.

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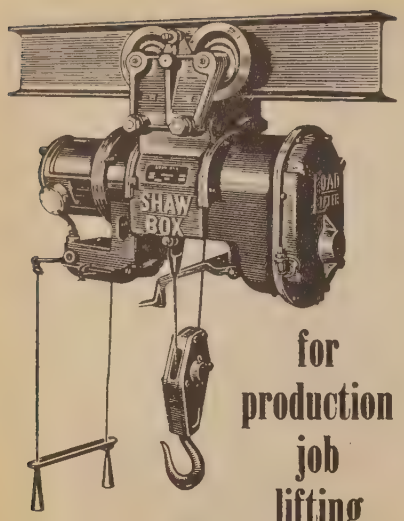
TRADE MARK



for production job lifting

Some 'Load-Lifter' Electric Hoists are used to lift capacity and near-capacity loads several times every hour of the day all through the year. It's a tough demand to make of any hoist but the 'Load-Lifter' takes it! Doesn't demand much attention either!

There's a reason for the trouble-free service and the rugged performance of a 'Load-Lifter' Hoist. The explanation is found in its construction, in the special features built into it. Here are a few:

. . . one-point lubrication
. . . two-gear reduction drive
. . . self-contained ball-bearing motor
. . . fool-proof upper stop
. . . improved automatic load brake

and there are many others. All this means that if you have a tough lifting problem within the capacities of the 'Load-Lifter' Electric Hoist, it's the hoist for you! Besides dependable service and safe, economical lifting, it assures you of absolute safety for the operator.

'Load-Lifter' Electric Hoists are built with lifting capacities of 500 to 40,000 lbs., in all combinations required for industrial needs. They are adaptable to almost every working condition within their capacities. Write for Catalog No. 215.

MAXWELL MANNING MOORE INC. TRADE MARK

'LOAD LIFTER' *Hoists*

MANNING, MAXWELL & MOORE, INC.
MUSKEGON, MICHIGAN

Builders of 'Shaw-Box' Cranes, 'Budgit' and 'Load Lifter' Hoists and other lifting specialties. Makers of Ashcroft Gauges, Hancock Valves, Consolidated Safety and Relief Valves and 'American' industrial instruments.

(Continued from page 262)

Milk is said to be a particularly valuable protective agent, since it is rich in both protein and minerals, especially calcium. Experiments with animals, according to the Institute, have shown that those on a diet low in calcium are more seriously damaged by liver poisons than those on a high calcium diet. Moreover, many individuals affected by industrial chemicals have been cured by treatment with calcium and protein products. Some authorities advise that workers handling lead or other metals, chlorinated solvents, or hydrofluoric acid should be instructed to drink a quart of milk a day.

Various vitamins are believed to be important protective agents against one or another of the industrial chemicals. The Institute recommends that the diet be adequate in vitamin-rich foods, such as fresh fruits and vegetables. In some plants, specific supplements are supplied, on recommendation by the plant physician.

Alcoholism Is Favorable To Chemical Poisoning

Alcoholism greatly increases the susceptibility of the individual to chemical poisoning, and employes should be warned accordingly.

Although allowance must be made for varying conditions, the most generally recommended diet for workers handling potentially harmful chemicals is one which is low in fat, high in protein and carbohydrates, and adequate in minerals and vitamins, it is concluded. The safety education program for personnel employed in chemical departments may well include information on proper diet as a factor in the safe use of industrial chemicals, the Institute believes.

"Have you any easy jobs open in the executive end of the business!"

Is your soldering equipment OUTDATED?

Kwikheat is as modern as tomorrow—the only soldering iron with built-in thermostat plus the many other valuable features shown below. Compare your present soldering equipment with Kwikheat and you'll agree —from tip to plug Kwikheat is in a class by itself!

List . . $11.00

KWIKHEAT is modern in every respect!

- HOT IN 90 SECONDS
- HEAT CONTROL BUILT-IN
- SAFE . . . CAN'T OVERHEAT
- LESS RETINNING NEEDED
- LIGHT WEIGHT — 13½ OZ.
- COOL PROTECTING HANDLE
- HEAVY POWER — 225 WATTS
- EXTRA-DURABLE TIPS

SIX TIP STYLES

Each $1.25

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VANATTA

KWIKHEAT THERMOSTATIC SOLDERING IRON

Kwikheat Division - Sound Equipment Corp. of Calif.
3903 San Fernando Rd., Glendale 4, Calif.

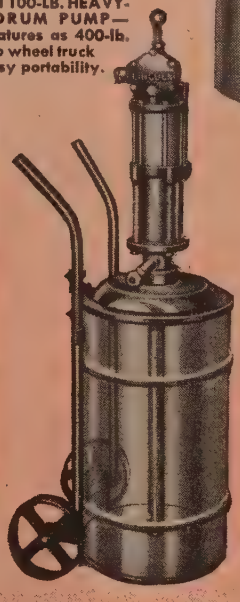
LINCOLN GREASE FITTINGS—All Sizes—All Types. A complete line for industrial applications.

LINCOLN HIGH-PRESSURE BUCKET PUMP—A 30-lb. capacity grease gun. Manually operated. Portable. Has a patented venting device which prevents leaking of lubricant when coupler is disengaged from fitting.

LINCOLN HEAVY-DUTY LEVER TYPE GREASE GUN—Develops 10,000 lbs. pressure with ease. Has a 17-ounce capacity.

LINCOLN HANDI-LUBER—Converts an original 25-lb. refinery pail into a high-pressure grease gun. Easily attached without removing container lid.

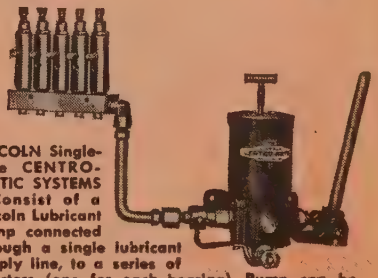
LINCOLN 100-LB. HEAVY-DUTY DRUM PUMP—Same features as 400-lb. unit. Two wheel truck gives easy portability.



LINCOLN 400-LB. HEAVY-DUTY DRUM PUMP—Pumps lubricants, sealing compound, insulating compound, putty and other viscous materials direct from original containers.

LINCOLN POWERLUBER—A compressed air-motor-operated grease gun. Pumps lubricant direct from 25- or 50-lb. container, or holds 60-lbs. in bulk. Two wheel truck for easy portability can be furnished.

LINCOLN PUSH-TYPE GREASE GUNS—Available in 9- and 15-ounce capacities. All-Steel construction.



LINCOLN Single-Line CENTRO-MATIC SYSTEMS—Consist of a Lincoln Lubricant Pump connected through a single lubricant supply line, to a series of injectors (one for each bearing). Pump can be hand-operated or power-operated with time clock control. These systems can be installed to supply a single machine or a battery of machines.

LINCOLN

Lubricating Equipment

Engineered to Protect and Increase the Productive Service-Life of Your Machinery

Regardless of plant lubrication requirements—either a complete centralized system or grease fittings and hand guns—Lincoln can supply the lubricating equipment that will help increase the service life and output of your machines.

Stubborn lubrication problems are being solved daily through the use of Lincoln Lubricating Equipment. The line is complete and includes everything needed to give industry top lubrication efficiency. A few of the many Lincoln products are illustrated above.

Pioneer Builders of Engineered Lubricating Equipment

ASK YOUR *Lincoln* WHOLESALER

He has experienced men ready to help you with your lubrication problems and can supply your requirements. If there is no Lincoln wholesaler convenient, mail coupon for literature and complete information.

LINCOLN ENGINEERING COMPANY, ST. LOUIS 20, MO.

Gentlemen: Please send me catalog on Lincoln Industrial Lubricating Equipment ☐. I would like to have literature on Centro-Matic Lubricating Systems ☐.

*Name*_____

*Title*_____

*Company*_____

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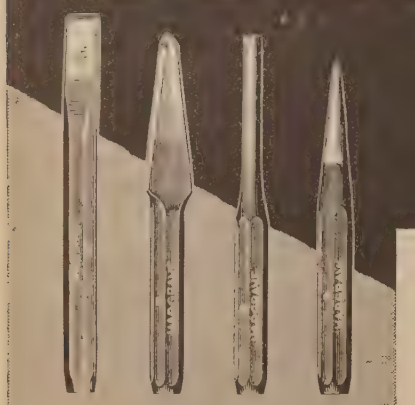
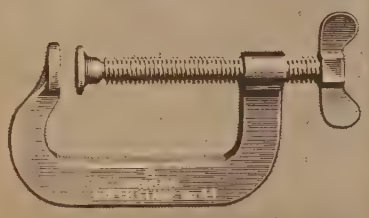
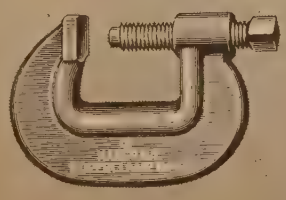
MF 847 2

TIPS You Can Trust

HARGRAVE TESTED TOOLS







Here are some swell tips you can rely on — Hargrave Chisels and Punches. These famous tools are Individually Tested for Hardness and Toughness. As a result, they're rugged enough to give lasting service despite toughest use. These Hargrave Tools are made from special analysis steel, trip-hammer forged (not drop forged). Each tool is properly balanced and proportioned. And there is a Chisel and Punch for every job.

Also illustrated from top to bottom are: Improved Spring Clamp; Super Junior Forged Steel Clamp; No. 44 Forged Steel Super Clamp; No. 40 Forged Steel Heavy Service Super Clamp; Clamp Fixture and File Cleaner with Chip Plow. All Hargrave Clamps are Individually Tested. Sizes range from ¾" to 10' openings, from ½" to 16" deep.

Although delivery is delayed on some of our tools we are doing everything to meet your requirements as quickly as possible.

WRITE FOR CATALOG

showing the complete line of Hargrave Clamps, Chisels, Punches, File Cleaners, Brace Wrenches, Washer Cutters, etc.

THERE IS AN INDUSTRIAL DISTRIBUTOR STOCK NEAR YOU

4031 Montgomery Road
Cincinnati 12, Ohio

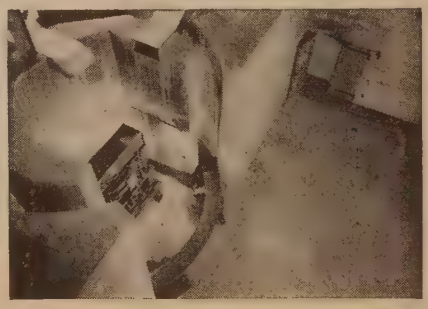
The CINCINNATI TOOL Co.

COMPANY ACTIVITIES

• Betatron Is Demonstrated

A 20,000,000 volt betatron, a machine whose rays can penetrate 20" of steel in 20 minutes and detect flaws of almost microscopic dimensions and which is manufactured by the Allis Chalmers Corp., has been demonstrated at a three day forum at Picatinny Arsenal, Dover, N. J. The forum was attended by representatives of industry, the press, and by over 60 physicians who saw its application in the fields of medicine and biological research.

The betatron is described as a dependable, foolproof and economical tool for all industry. Betatron radiation enables its rays to pentrate the thickest steel, and makes enlargements on radiograph film directly. The unit is housed in a special X-ray laboratory at the Arsenal.



Looking down at the betatron.

The betatron is a two-winding transformer with a stream of electrons for a secondary winding. The secondary high voltage winding, instead of being made up of the hundreds of thousands of turns of very small wire which would be necessary to produce 20 million volts, is replaced by a simple donut shaped vacuum tube. Projecting into the tube is a sturdy filament and a tiny platinum target. When a rich supply of electrons is shot from the filament into the vacuum inside the donut, the magnetic flux acts on them in much the same manner as if they were moving inside the turns of wire. The betatron steel core is made with a small air gap in the center leg, allowing the donut and a specially designed circular steel pole piece to be inserted. As the magnet or core is energized, the flux surrounding this circular pole piece builds up and acts to keep the electrons in a circular orbit while accelerating them.

In the 1/720 of a second that all of this takes place, the electron

(Continued on page 268)

SAFETY

for men and material

one of the reasons why industry prefers Elwell-Parker Trucks

When you own Elwell-Parkers, the *maximum protection* they provide is a great source of satisfaction. Elwell-Parker users appreciate these features:

POSITIVE "ON-OFF" CONTROL—Truck cannot move unless operator stands on *both* pedals. Likewise it stops when he steps off the pedals, because brakes are applied and power is shut off.

SEPARATE OPERATION OF POWER AND BRAKE—This feature is invaluable when starting heavy loads on ramps, since power is applied before brake is gradually released. No fuses in power circuit but Elwell-Parker motors take the full electric current the battery supplies.

SAFETY CONTROL—Drive controller turns to "off" the moment operator releases handle. Limit switches and electric brakes automatically control, and overload slip clutches protect the other motors.

EASY HANDLING—By reducing operator fatigue, insures careful driving. Operators are always alert because Elwell-Parker Trucks have cushioned pedals, easy steering, controlled speed and smooth, quiet operation.

SUPER STRENGTH—Elwell-Parker Trucks are "tank-tough" in both fabrication and materials. This strength is another assurance of safety in operation.

LESS FIRE HAZARD—All trucks carry Underwriters' Laboratories' UL Seal. Elwell-Parker built Class B motors have more costly glass and asbestos insulation.

Yes, Elwell-Parker advanced design and construction enable you to *forget* truck safety problems. For proper application of these trucks to your specific needs call in the nearest E-P man. The Elwell-Parker Electric Co., 4226 St. Clair Ave., Cleveland 14, O.

Here's why they buy **Elwell-Parkers** and keep on buying 'em

Longer Life
Ample Power
Greater Safety
Easy Handling
Super Strength

plus
ELWELL-PARKER'S
unmatched experience
in materials handling.

ELWELL-PARKER

Established 1893

POWER INDUSTRIAL TRUCKS

WHERE SPEED AND PRECISION GO HAND IN HAND!

These six intricate drill jigs for horizontal Natco set-ups—complete with patterns, equipment and castings—were produced by MERZ *in just 10 weeks!* More important still, they had to be—and were—built to the highest precision standards for drilling, reaming and counter-boring vital engine parts! This is a typical example of what is done daily at MERZ—*where speed and precision go hand in hand.* MERZ designs and produces standard A.G.D. and special gages, tools, dies and experimental machines. Write for complete information on MERZ precision products and services.

WATCH FOR SPECIAL ANNOUNCEMENT SOON ON NEW MERZ AIR GAGES!

MERZ Engineering Company
INDIANAPOLIS 7, INDIANA

Aircraft Wire—tinned or alloy coated and galvanized
Armature Binding Wire—tinned or alloy coated
Belt Hook Wire—tinned, galvanized or alloy coated
Bobby Pin Wire
Brush Wire—round scratch brush, tempered and untempered. High strain white liquor finish
Card Wire—tempered, round, angular, single convex, double convex
Curtain Spring Wire—round, flat
Fish Leader Wire
Flexible Shaft Wire—Music Wire quality
Hard Drawn Spring Wire
Heddle Wire
Hose Reinforcement Wire
Mandolin Wire
Music Wire, bright, tinned or alloy coated
Piano Wire, perfected quality
Rope Wire, bright or galvanized—mild plow, plow, improved plow
Seal Wire
Stainless Steel Wire
Stapling Wire
Stitching Wire
Tire Wire—bronze plated

JOHNSON
STEEL AND WIRE COMPANY, INC.
WORCESTER 1, MASS.
NEW YORK AKRON DETROIT CHICAGO LOS ANGELES TORONTO

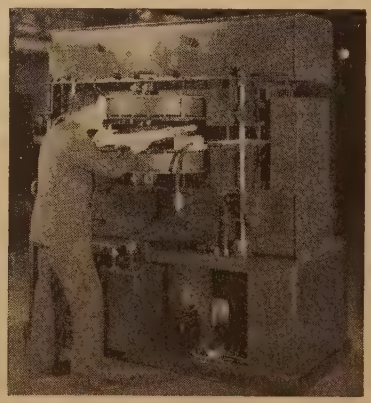
(Continued from page 266)

stream races around the inside of the donut several hundred thousand times, nearly approaching the speed of light. At the peak of their speed, a pulse of current from an electronic circuit in the betatron control upsets the magnetic field and the electrons spiral off and collide with the tip of the small target.

Final adjustments are made on exposure control chamber of the betatron.

At this terrific speed, the energy which the electrons give up in the collision with the target creates a rich supply of very high frequency X-rays which emerge through the walls of the donut as if they did not exist.

The betatron, by combining a transformer winding and an X-ray tube in one small porcelain donut becomes one of the first tools of the atomic age for industry, medicine and science.



Inside this "donut", electrons spin 300,000 times in about 1/720 second.

A competent laboratory technician can operate the betatron, which has, as its biggest advantages the greatly increased speed and far greater detail with which X-rays can be made. Instead of X-raying one out of 50 or 100 or more units of heavy equipment, it will be practical to X-ray every piece produced.

Because of the special interest in

(Continued on page 270)

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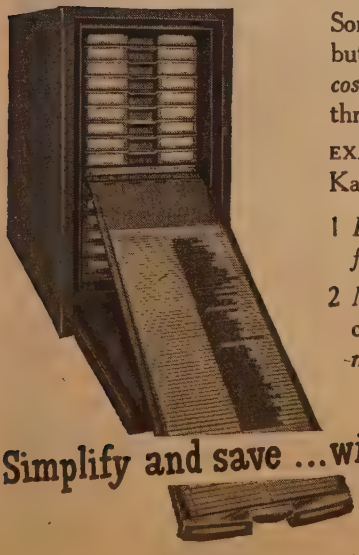
There's no room for cost-heavy systems AND profits



Some of today's higher costs can't be avoided, but you can sharply reduce your *controllable costs* by simplifying systems and procedures throughout your organization.

EXAMPLE: A wholesaler recently adopted a Kardex-simplified stock control system that:

1 *Enables two girls to do clerical work that formerly required six girls.*

2 *Makes it possible, through closer inventory* control, *to speed turnover and reduce his merchandise investment by thousands of dollars.*

3 *Assures him a* controlled *stock of quick-selling items needed to get—and hold—day-to-day business from important customers.*

Whatever type of business you are in, and whether your costs are high in sales . . . inventory . . . production . . . ledger . . . or personnel, Remington Rand simplified systems can pay you extra savings by reducing these *controllable* costs. Let's talk it over! Phone our nearest office for booklet GRAPH-A-MATIC MANAGEMENT CONTROL, or write SYSTEMS DIVISION, 315 FOURTH AVENUE, NEW YORK 10, N. Y.

Simplify and save ... with KARDEX

Remington Rand

THE FIRST NAME IN BUSINESS SYSTEMS

THE *Extra* HOLDING POWER IN CHICAGO "SAFETY PLUS"

In deciding what fastening to use in your products, consider the importance of the *extra* holding power in Chicago "Safety Plus" Socket Head Cap Screws. This "extra" results from the use of especially selected alloy steel, plus correct heat treating practice—combined with precision threading method designed to give full thread engagement.

The greater tensile strength of "Safety Plus" permits using fewer fastenings, resulting in a noticeable reduction in weight and a neater, sturdier construction in your products.

In addition, the smaller heads with internal wrenching permit locating "Safety Plus" screws in areas too small for protruding hexagon heads.

Make use of Chicago "Safety Plus" EXTRA strength to make your products EXTRA GOOD.

These Fine Products are sold only thru Authorized Distributors

CHICAGO "Safety Plus" line includes:

- Socket Head Cap Screws
- Socket Set Screws
- Stripper Bolts
- Square Head Dog Point Set Screws
- Pipe Plugs
- Keys for "Safety Plus" Products

Complete line includes:

- Hexagon Head Cap Screws
- Square Head Cup Point Set Screws
- Headless Set Screws
- Fillister Head Cap Screws
- Flat Head Cap Screws
- Taper Pins
- Milled Studs
- Semi-Finished Hexagon Nuts
- Semi-Finished Hexagon Castellated Nuts

THE CHICAGO SCREW CO.

ESTABLISHED 1872

1026 So. Homan Avenue Chicago 24, Ill.

(Continued from page 268)

the betatron for application to biological and medical research, Dr. G. M. Almy of the University of Illinois Physics Department, and Dr. L. S. Skaggs of Michael Reese Hospital in Chicago, addressed the visiting physicians on the vast field of radiation therapy opened up through the betatron.

Both of these men were associated with the recent announcement from the University of Illinois pointing out that they had been successful in diverting the 20 million volt electron stream itself to the outside of the betatron "donut" making possible for the first time such a high energy source of free electrons. The new X-ray machine is reported to be ready for use by medical and physical research groups to perfect methods of applying betatron roentgen and electron radiations to clinical therapy.

Col. W. E. Larned, commanding officer, opened the three-day forum at Picatinny Arsenal. Col. C. R. Dutton, chief, Technical Division, Dr. G. J. Mueller, Dr. B. A. Lloyd and Miss Kathleen George, all from the Picatinny Physical Laboratories, acted as technical advisers during the demonstration period. D. T. Scag, consultant on betatron design, associated with the University of Illinois and Allis Chalmers, and J. T. Wilson, Allis Chalmers chief physicist, also participated in the program.

● Veeder-Root Open House

An open house from Dec. 14 until Dec. 17 marked the opening of the new factory building of Veeder-Root, Inc. at Hartford Conn. The building is an addition to the company's manufacturing and administrative headquarters at Garden and Sargeant Sts. and is a 3-story addition which adds 40,000 square feet to the company's headquarters operations.

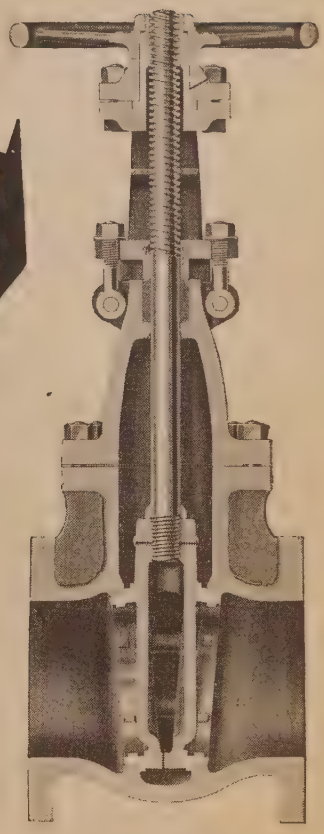
During the open house for thousands of the employes, customers,

(Continued on page 272)

Every feature you want in an

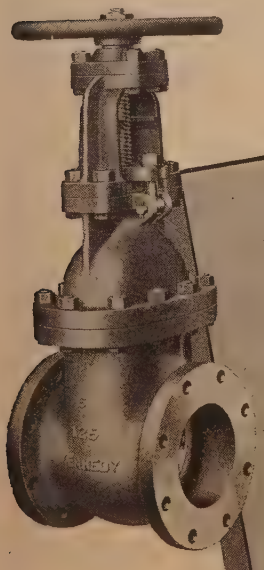
IRON BODY WEDGE GATE VALVE

is in this KENNEDY DESIGN



Whether you examine this Kennedy Standard Iron Body Wedge Gate Valve for basic features that assure ample strength, long service and trouble-free operation, or for refinements that provide extra conveniences and ease of assembly, operation and maintenance, you will find a design that gives you extra values . . . at no extra cost.

Engineers who have tried these valves have become so enthusiastic about their many superiorities that plants all over the country have standardized on them for iron-body wedge gate valve services. These superiorities are fully described in the 240-page Kennedy Catalog, which also shows the entire Kennedy line of bronze and iron body gate, globe, angle and check valves, malleable iron and bronze screwed pipe fittings, and cast iron flanged fittings and flanges. Be sure to write for your copy today . . . you will find it a valuable help in the selection of valves and pipe fittings for your requirements.



Buy From Our Distributor

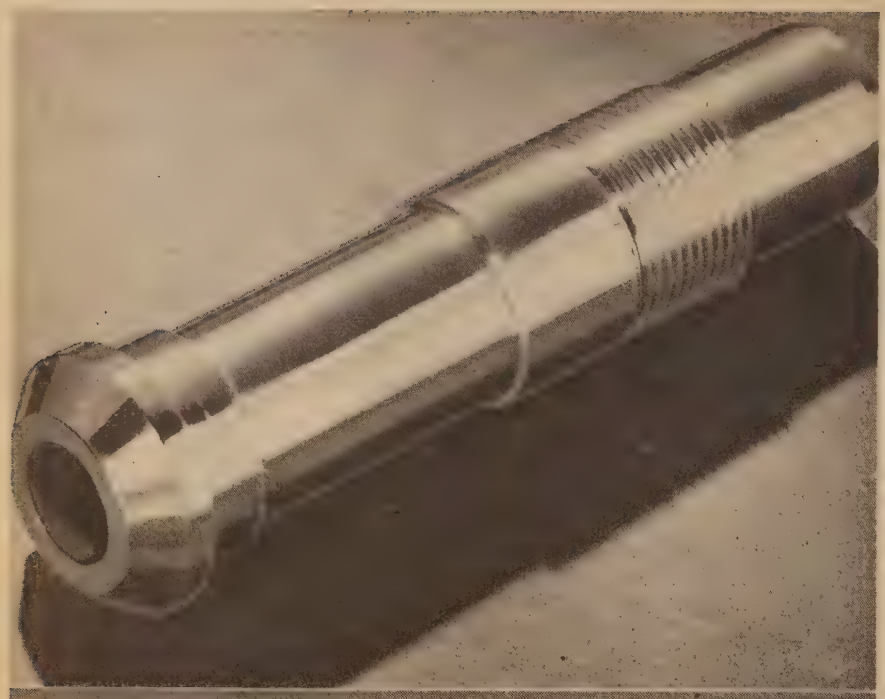
YOU WANT THESE VALVE FEATURES
. . . you'll find them in this KENNEDY design

1. **Generous Strength . . .** Body and bonnet are of high-grade dense metal with ample thickness and rounded fillets. Stem has large diameter and extra large number of contact threads.
2. **Easy Operation . . .** Stem and stem contact surfaces are accurately threaded. Deep stuffing boxes permit tightness without undue pressure on packing. Large handwheel gives firm, comfortable grip.
3. **Lasting Tightness . . .** Discs and seats seat accurately, and their sturdy design resists distortion and has special provisions for take-up of wear.
4. **Long Life . . .** Many Kennedy valves have been in daily use a quarter century and more.
5. **Convenient Repacking . . .** Glands and packing are easily accessible.
6. **Economical Maintenance . . .** Long wear built into all parts, and adjustments or other attention are seldom required.

THE KENNEDY VALVE MFG. CO.
Elmira, New York

KV-137

KENNEDY *valves - pipe fittings - fire hydrants*



Ampco Metal
Extruded Rod gives you

Production savings of Extruded stock

1. Cuts production costs.
2. Reduces waste — sizes parallel requirements.
3. Cuts machining time and saves metal.
4. Smooth surface and compact structure cuts rejections for flaws.

plus

Performance advantages of Ampco Metal

1. Higher fatigue and impact values for longer life.
2. Stronger than other bronze parts for less replacement cost.
3. Higher compressive strength for added durability.
4. Lighter than other bronzes — your equipment weighs less.

You get a double benefit when you use Ampco Metal extruded rod. Production economy and operating stamina make Ampco Metal extruded rod the ideal stock for parts subject to wear, impact, fatigue and corrosion.

Extruded Ampco rods are produced in two grades of Ampco Metal and two grades of Ampcoloy bronze — by the largest extrusion press in the Middle West, and one of the few in the world devoted exclusively to the extrusion of aluminum bronze. Specialization by Ampco has resulted in a finished product whose quality is a production advantage to you and a performance advantage to your customers. Ask your nearby Ampco engineer to help you specify the proper grade for your requirements.

REG. U. S. PAT. OFF
AMPCO Metal
The Metal without an Equal

Write for bulletin 64A.

Ampco Metal, Inc.
Department MF-2 • Milwaukee 4, Wisconsin
Field Offices in Principal Cities

A-32

(Continued from page 270)

and friends, the entire second floor of the building was given over to an exhibit of company products. The main exhibit was composed of over 70 different products in which Veeder-Root counters are built as integral features of original equipment. The equipment was sent in by customers all over the country and served to give employes and visitors a broad general picture of the wide range of uses to which counters can be put. The exhibit began with old-time cyclometers which were used on bicycles in the eighties and are still attached to modern bicycles today.

The exhibit was planned for the primary purpose of showing company employes the meaning and importance of their individual jobs by showing where the products they helped to build were used after they were shipped out of the plants. Before the open house, a special booklet was sent to each employe's home in the mail. It carried a special cover on which the individual employe's name was hand lettered. The text carried an invitation to the the whole family to come down to the plant to see where John or Joan worked, what the job entailed, and how the final product looked.

Nurses were on hand to take charge of the children and tours were organized in small family groups so that all could see the company's over-all setup and the particular work station of the family individual employed by Veeder-Root. On the second day reserved for employes, families and friends, nearly 3000 people made the tour. During the entire open house, the company's cafeteria served coffee and doughnuts to guests.

On hand to welcome visitors and answer questions were members of the company's engineering, sales and administrative departments; the company's president, John H. Chaplin; the sales manager, A. E. Kallinich, and chief of engineering, Harvey Spaunburg.

Among products sent in by manufacturers for the display were gasoline computer pumps, meter registers for fuel oil bulk, plants and delivery trucks, tractor engines, milling machine cutter heads, textile winding and testing machinery, postage metering equipment, printing presses, duplicating equipment, card-sorting equipment, pin ball machines, deep-freeze units—and many other types of equipment in which Veeder-Root counting devices are standard features.

(Continued on page 274)

with any special machining required

So many customers have requested additional machine work on special die sets, that such service is now made generally available.

Complete equipment is installed to do any desired machine work to the customer's specifications on any special die set made by this company including M-K & A-S sets, as listed in general catalog.

These special die sets may now be delivered completely machined ready for the mounting of the die. This service saves time, as the work on the die and the die set can proceed simultaneously.

It permits the die shop or tool room to devote their equipment and man hours to the making of dies.

This service also solves the problem of the handling of big sets, for which the die shop or tool room may not have the machining or handling equipment to perform the necessary work economically.

We would like to know what you think of this new Danly Service to the tool and die shops and tool rooms of America. On your next special die set inquiry include the additional machining work that you believe could be advantageously handled "on the outside." The cost of such machining will be shown as an individual item in the quotation.

DANLY MACHINE SPECIALTIES, INC.

2100 South 52nd Avenue • *Chicago 50, Illinois*

Milwaukee 2....111 East Wisconsin
Detroit 16.....1549 Temple Avenue
Cleveland 14..1550 East 33rd Street
Dayton 2.....990 East Monument
Rochester 4...16 Commercial Street
Philadelphia 44..18 W. Chelten Ave.
Long Island City 1.47-28 37th Street

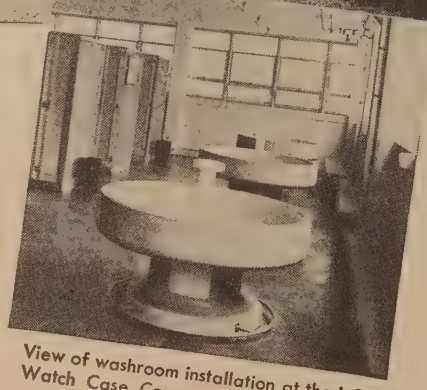
Ducommun Metals & Supply Company
4890 South Alameda, Los Angeles 7

DANLY *Special* DIE SETS

MACHINED TO YOUR SPECIFICATIONS

Designed for Utility

Modern new home of the I. D. Watch Case Company, Jamaica, Long Island.



View of washroom installation at the I. D. Watch Case Company—showing group of Bradley Washfountains.

The modern plant shown above is an outstanding example of "designing for utility" and the Bradley Washfountains used in this plant are similarly recognized as foremost examples of efficiency plus utility.

One Bradley serves 8 to 10 persons simultaneously thus eliminating that number of single-person wash basins. Furthermore, water consumption is reduced by 75% and valuable floor space released for productive use. In addition to these advantages, a Bradley installation safeguards health and reduces absenteeism: automatic foot-control, easily-cleaned central spray-head, and self-flushing bowl keep hands free from contagious washbowl or faucet contacts and prevent contaminating collections of dirty water. Bradley's are nationally distributed through plumbing jobbers.

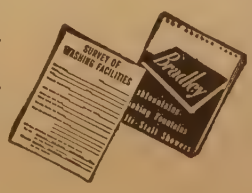
For further details and specifications, write for Illustrated Pamphlet F-508 and Survey of Washroom Layout Sheet. BRADLEY WASHFOUNTAIN CO., 2241 W. Michigan St., Milwaukee 1, Wisconsin.

Conserve Hard-to-Get Materials and Labor

With today's scarcity of materials and labor, it is especially important to take advantage of the savings offered by a Bradley installation. Since one Bradley replaces 8 to 10 single-person wash basins, it not only eliminates 16 to 20 faucets plus 24 to 30 piping connections but it also saves the labor required on ten individual installations as well as the usual maintenance work.

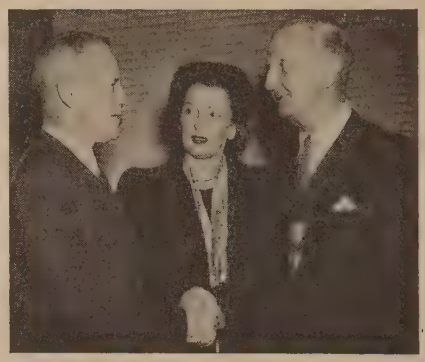
BRADLEY Washfountains

Send for your copy of Illustrated Pamphlet F-508 and Survey of Washroom Layout Sheet TODAY.



(Continued from page 272)

• J. L. Collyer Honored



John L. Collyer, right, president of The B. F. Goodrich Co., was recently awarded the Medal of Merit, highest honor conferred on civilians for meritorious service in wartime by Secretary of War Robert Patterson, while Mrs. Collyer looked on. The citation recounted Mr. Collyer's advocacy of establishing national facilities for making American rubber 18 months before Pearl Harbor; his early proposals to create stockpiles of natural rubber as a defense measure; his offer to make his company's experience with man-made rubbers available to the government and industry; his focusing of the nation's attention on its critical rubber supply position during the war, as well as taking energetic steps which were a great factor in the nation's conquering its rubber supply difficulties.

Mr. Collyer served as special director of rubber programs for the government during one of the most critical periods of the tire and rubber shortage and since the conflict ended, has been an advisor to the state department in international negotiations on rubber.

• Manhattan Honored Again

For the fourth consecutive year, Manhattan Rubber Division of Raybestos-Manhattan, Inc., Passaic, N. J., has received honors from the National Victory Garden Institute. The last award was given for encouraging backyard gardens and home food preservation chiefly through educational garden articles in the company's magazine, *Manhattanite.*

For three years Manhattan was given the highest award, a plaque in recognition of the patriotic work done by employes on the 10½ acre project allotted for the purpose. Although the Manhattan Victory gardens were discontinued this year, the company continued to encourage

(Continued on page 276)

Which Resists Corrosion Best on What?

BITUMASTIC* BLACK SOLUTION

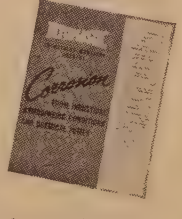
BITUMASTIC #50

BITUMASTIC TANK SOLUTION

BITUMASTIC HI-HEAT GRAY

BITUMASTIC SUPER SERVICE BLACK

Carefully refined coal tar pitch, long proven a dependable protection against corrosion, is the base of all five. The selection of the right one for the right surface is a matter of matching product to surface and conditions.



If it's part of your job to defend metal, masonry or concrete surfaces against untimely deterioration due to atmosphere, water or chemical fumes, let us send you a folder on "Corrosion"—giving the correct use of these five surface savers. We'll also mail you regularly a bulletin devoted exclusively to the selection and application of Bitumastic protective coatings. Address Wailes Dove-Hermiston, Westfield, N. J.

Reg. U. S. Pat. Office

GENUINE **BITUMASTIC**

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IS MADE ONLY BY

WAILES DOVE-HERMISTON

CORPORATION • A SUBSIDIARY OF

KOPPERS COMPANY INC.

WESTFIELD, NEW JERSEY

K KOPPERS

NEW YORK 4 • PHILADELPHIA 8 • CLEVELAND 14 • CHICAGO 3 • HOUSTON 2
TULSA 3 • MIAMI 36 • SAN FRANCISCO 10 • LOS ANGELES 1

COMPLETE OUTFITS

for All Types of Welding and Cutting

Gasweld

WG-25 Welding Outfit with Cutting Attachment

Welding and Cutting Torches

Gasweld Equipment conforms fully with standards of the Underwriters' Laboratories.

WG-25 Welding Torch

All types of "Gasweld" Torches are now available as part of general welding and cutting outfits — complete with oxygen and acetylene regulators, goggles, hose and safety spark lighter. Whatever the job — there's a "Gasweld" Torch for the purpose — with less "handling fatigue" and greater economy in gas consumption. Gasweld units have the speed, feel, and handiness that experienced operators look for and prefer. *Dealerships open — write for information.*

Wall Chemicals Division of
THE Liquid CARBONIC CORPORATION
Chicago 23, Ill., 3110 S. Kedzie Ave.
Branches and Dealers in Principal Cities

Now!

ARRO - SPIN DRILL

ARRO-SPIN DRILLS

FOR MASONRY—with Genuine CARBOLOY TIPS

- Arro-Spin drills in ROTARY electric portable drills end noisy, monotonous chiseling.
- Drills 4 times faster—the fastest cutting drill ever introduced.
- Lasts up to 50 times longer—the longest-wearing drill you've ever used.
- Smooth, quiet cutting of concrete, brick, marble, tile, slate, limestone, etc.
- Available in sizes from 3-16" to 1½" diameter.
- Drills clean holes for proper fits of expansion shields, anchors, toggle bolts, etc.

ARRO EXPANSION BOLT COMPANY • MARION, OHIO

Other ARRO Products

Sold only through jobbers

(Continued from page 274)

backyard gardening and food preservation. To promote gardening, all tools and equipment used in the Victory Garden project were donated to the Passaic Home and Orphan Asylum to encourage children in production of their own food.

• 5100-Lb. Bearings

Machining of the largest spherical roller bearings ever built in the United States—two steel giants that will weigh more than two and a half tons each when fully assembled —is now under way at SKF Industries, Inc., Philadelphia, Pa.

Four feet in diameter, and 1,500,000 times heavier than the smallest bearing produced by the company, they will be installed on the world's biggest super-calender now under construction at the Beloit, Iron Works, Beloit Wis., for the Niagara, Wis., paper mill of Kimberly-Clark Corp.

Eighteen other spherical roller bearings, two weighing 2,700 lbs. each and 16 weighing 121 lbs. each, making a total weight for all bearings of 17,536 lbs., also are being manufactured by the Philadelphia ball and roller bearing firm for the top and intermediate rolls of the super-calender.

Rolled forgings which will become the inner rings of the 5,100-lb. bearings, each of whose 38 rollers will weigh about 35 lbs. apiece, were the first to be clamped into the jaws of one of the company's boring mills for the start of operations necessary to machine them to precise dimensions.

Excess metal will be removed from the forgings by carbide cutting tools before the rings are hardened by heat treating, sand-blasted, and sent to grinding machines.

Each of the bearings, designed for a basic load-carrying capacity in excess of 4,000,000 lbs., will be

(Continued on page 278)

COMING YOUR WAY...THIS FAMOUS LINE OF HAND TOOLS IN SENSATIONAL···

New Design

The new OVAL designing of New Britain Drive Parts throws out the useless bulk in old, round shapes and adds material where it is really needed—in the direction of strain! Extraordinary strength has been packed into slim, streamlined Handles with palm-fitted grips that are a revelation in "feel" and utility. Also coming, are bulk-free heads on modern Ratchets of startling reduced weight but amazing turning power, plus sure-action simplicity...you'll have new-day, precision balanced Screw Drivers and rugged Box and Open End Wrenches that breeze with ease through the toughest jobs in the tightest corners. Here, indeed, are Mechanics Hand Tools that make money! The New Britain Machine Co., New Britain, Conn.

The complete New Britain Line for Automotive, Aircraft, General Maintenance and Production Needs is sold by leading Jobbers.

New Britain

GREATER STRENGTH · BETTER FIT **HAND TOOLS**

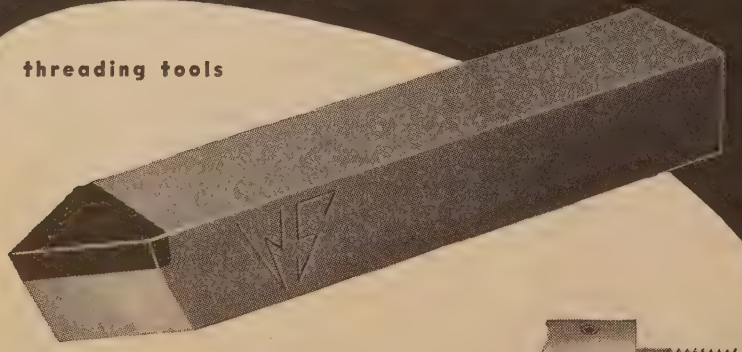
sheave cutters

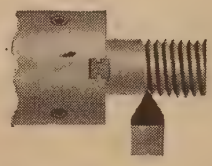
For

PRODUCTION GROOVING AND THREAD CUTTING

WENDT-SONIS CARBIDE TOOLS

threading tools





Now! Grooving and thread cutting operations can be done faster, more economically with Wendt-Sonis Carbide Tools. Each tool is especially designed for its job. Available from stock in a wide range of sizes and grades. Shanks scientifically hardened. Cutting angles are based on exhaustive tests made under actual production conditions. Use Wendt-Sonis Carbide Tools to increase your production — help combat rising costs. Get complete details by writing WENDT-SONIS COMPANY, Hannibal, Missouri or 580 North Prairie Avenue, Hawthorne, California.

WENDT SONIS

CARBIDE TIPPED CUTTING TOOLS

BORING TOOLS • CENTERS • COUNTERBORES • SPOTFACERS • CUT-OFF TOOLS • DRILLS • END MILLS • FLY CUTTERS • TOOL BITS • MILLING CUTTERS • REAMERS • ROLLER TURNING TOOLS • SPECIAL BITS

(Continued from page 276)

used to support the bottom rolls of the 10-roll calender, a machine that imparts a high-quality finish to paper as it passes between a series of rolls under tremendous pressure.

● G-E Man Honored

W. C. Yates, assistant manager of the General Electric Company's Industrial Divisions, was recently honored at a dinner in Schenectady, N. Y., by officials of control equipment manufacturing companies throughout the country. The dinner was in recognition of Mr. Yates' 30 years affiliation with the controy section activities of the National Electrical Manufacturers' Association. He has been a member of NEMA since its inception and has been a member of the association's industrial control section advisory committee for many years. The dinner was also in honor of his 48 years' service with General Electric. His retirement became effective Nov. 30, 1946.

● Transporting Tire Stacks

One man and an overhead traveling crane are now transporting and storing 11-ton stacks of locomotive wheel tires. Such simplification of this material movement task was made possible by the use of giant automatic tongs recently developed by Heppenstall Co., Pittsburgh.

Completely automatic in operation and eliminating ground crew assistance, these tongs were specifically designed to handle steel tires ranging in size from 2½ to 7 ft in diameter.

A unique locking device built into the tongs enables the crane operator to pick up 6 ft high stacks of tires coming from the mill—take them to storage—and later pick them up and transport them as needed to the inspection department.

(Continued on page 280)

Easier way to better piping ...CRANE Supplies Everything

Why do it the hard way when you can simplify every step of piping jobs—from design to erection to maintenance work. Specify Crane equipment—the truly complete line that not only includes everything you need, but assures the quality you want in every item.

This air service piping system, for example, shows the 3-way advantage of standardizing on the complete Crane line—

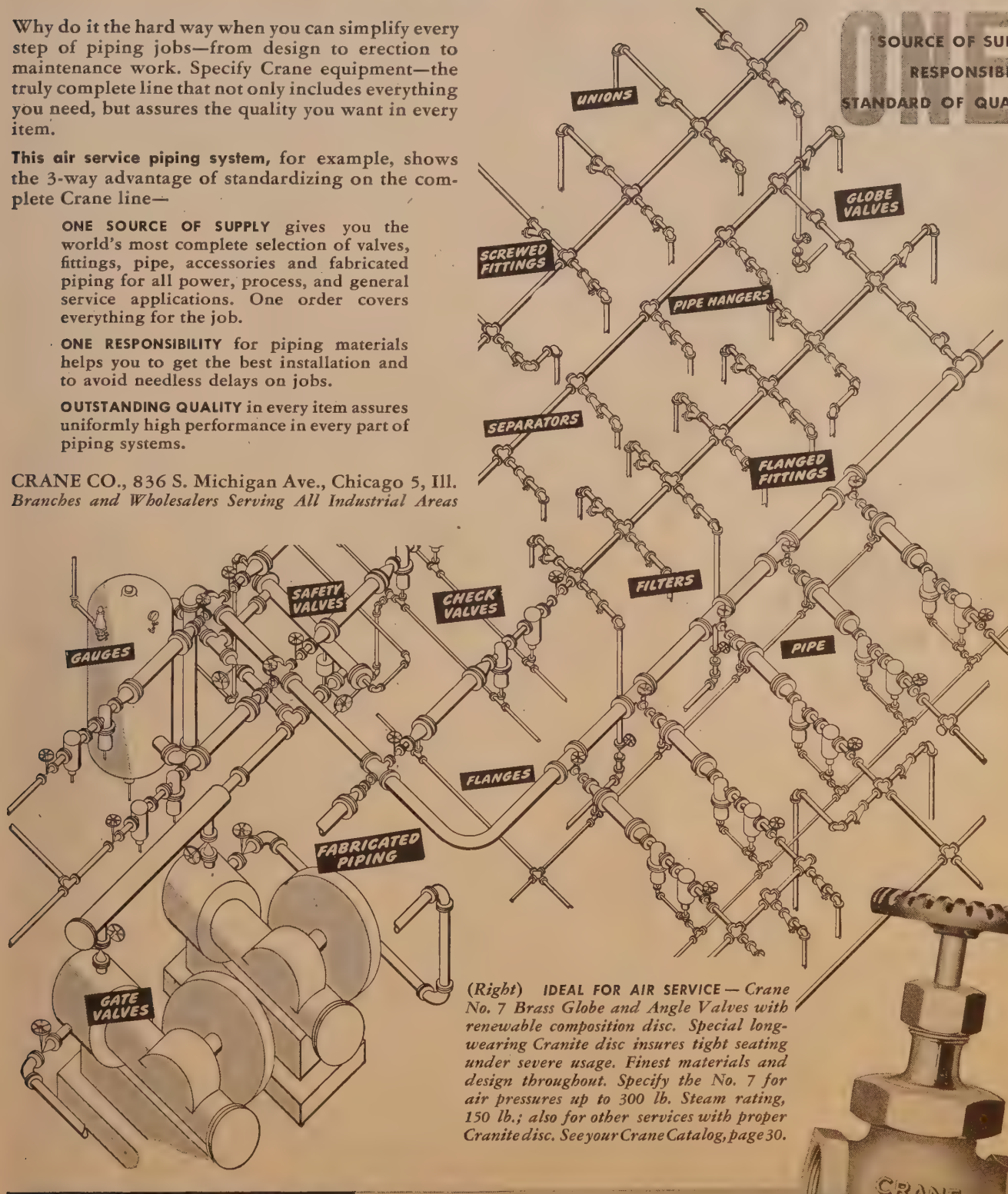
ONE SOURCE OF SUPPLY gives you the world's most complete selection of valves, fittings, pipe, accessories and fabricated piping for all power, process, and general service applications. One order covers everything for the job.

ONE RESPONSIBILITY for piping materials helps you to get the best installation and to avoid needless delays on jobs.

OUTSTANDING QUALITY in every item assures uniformly high performance in every part of piping systems.

CRANE CO., 836 S. Michigan Ave., Chicago 5, Ill.
Branches and Wholesalers Serving All Industrial Areas

ONE
SOURCE OF SUPPLY
RESPONSIBILITY
STANDARD OF QUALITY



(Right) **IDEAL FOR AIR SERVICE** — *Crane No. 7 Brass Globe and Angle Valves with renewable composition disc. Special long-wearing Cranite disc insures tight seating under severe usage. Finest materials and design throughout. Specify the No. 7 for air pressures up to 300 lb. Steam rating, 150 lb.; also for other services with proper Cranite disc. See your Crane Catalog, page 30.*

EVERYTHING FROM . . .

VALVES • FITTINGS
PIPE • PLUMBING
HEATING • PUMPS

CRANE

FOR EVERY PIPING SYSTEM

KINNEY
INTERCHANGE
CLUTCH

The Kinney Interchange Clutch starts this rugged W. W. Sly Tumbling Mill smoothly and positively . . . allows maximum slippage while picking up the load, without lowering the capacity when fully engaged. With power controlled by the Kinney Clutch, machine life is lengthened, a smaller motor is used and safe operation is assured. The clutch shifts easily since the friction plates are brought together by a rugged toggle mechanism . . . drive is transmitted directly through flat discs and not through bolts or engaging mechanism.

The Kinney Interchange Clutch is available in solid or split construction for easy installation; capacity 2 to 40 H.P. per 100 R.P.M. Write for Catalog K-8 describing the full line of Kinney Clutches.

KINNEY
MANUFACTURING CO.
3539 WASHINGTON ST., BOSTON 30, MASS.
New York • Chicago • Philadelphia
Los Angeles • San Francisco
We also manufacture Vacuum Pumps, Liquid Pumps and Bituminous Distributors.

(Continued from page 278)

These automatic tongs that are 15 ft high and weigh 3485 lbs do not require riggings or chains on the burden to be lifted. Since ground crews are not needed, no difficulties can result from misunderstood signals, premature lifts and loosely attached slings.

Hardened lifting lugs have been incorporated into the three jaws which have a maximum opening area of 87 ins.

● Kellogg's Retirement Plan

James H. Kellogg, president of Kellogg Switchboard and Supply Co., Chicago, Ill., has announced that the company has completed arrangements with trust department executives of the First National Bank of Chicago providing for payment of benefits under the Kellogg Company's Retirement Income Plan covering the 2,000 plant and office employees.

The firm's retirement plan has been submitted to the United States Treasury Department for review and approval.

It provides for an increase to employes who retire at the age of 65 having been employed by the company for at least 10 years. Provision has also been made for the retirement of employes at the age of 55 and up at modified amounts of benefits.

The retirement plan will be entirely financed by the Kellogg Co. A committee of seven employes, having an average age of 32 years of employment with the company, will administer the plan.

In July, 1945, the company also instituted a group life insurance plan including sickness, accident, hospitalization and surgical benefits.

● G-E Employes Honored

Ninety-five employes of the General Electric Co., who performed work of outstanding merit during the four war years 1942 through 1945, have received Charles A. Coffin awards for their accomplishments, it was announced by Charles E. Wilson, G-E president.

Because of the highly secret nature of the work which led to many of the awards, the presentations were the first since 1941.

Named for the first president and one of the founders of the General Electric Co., the Charles A. Coffin awards, the company's highest awards, carry a certificate and a cash honorarium. They provide re-

(Continued on page 282)

MANAGEMENT and PRODUCTION men want
FACTS
about equipment they buy

Here are FACTS about
Coffing Hoists

"SAFETY-PULL"
Ratchet Lever Hoists

For all kinds of construction and maintenance work, wherever a lift or pull is needed, there is a "Safety - Pull" to meet your requirements. SAFE, DURABLE, DEPENDABLE. Capacities range from ¾ to 15 tons, yet they weigh only 14 to 150 pounds.

"QUIK-LIFT"
Electric Hoists

For dependable and economical service the "Quik - Lift" incorporates EFFICIENCY with SPEED, POWER and DURABILITY. Just plug it in and speed up production. Capacities from 500 to 4000 pounds with lifting speeds from 4 to 49 feet per minute.

MODEL Y-C
Spur Geared Chain Hoists

Coffing Spur Geared Chain Hoists embody the planetary gear system with the Weston automatic brake. There are seven capacities ranging from ½ to 5 tons. A sturdy, dependable hoist for heavy work and in the production line.

Contact Your Supplier or Write for
BULLETIN B C-100
Coffing Hoist Co.
Danville, Illinois U. S. A.

YOUR PRESSES *CAN* DO MORE FOR YOU!

It's a simple matter to get (1) SAFER operation, (2) more operator satisfaction and (3) more production from your presses. Just install Schrader Press Controls. Let them put compressed air to work for you—efficiently! Eliminate fatiguing leg movements, keep hands automatically away from danger zone. Thousands of Schrader Press Control Sets are in use in leading plants.

Contact your mill supply distributor or write for Catalog 5 containing details on the various types of Schrader Controls for presses. You'll save money in many ways!

1844 1947

PRESS CONTROLS

OTHER SCHRADER PRODUCTS FOR EFFICIENT AIR CONTROL
Air Valves 2,3,4-way • Air Operated Machine Controls • Air Operated Press Controls • Quick Acting Couplers • Blow Guns • Air Ejection Sets • Hydraulic Gauges

Schrader
PRODUCTS
CONTROL THE AIR

A. SCHRADER'S SON, Division of Scovill Manufacturing Company, Incorporated, BROOKLYN 17, N. Y.

B-RIGHT-ON

Socket Screw Products

- COMPLETE STOCKS
- HIGHEST QUALITY

Production Runs Solicited

either standard or special

Phone your Industrial Distributor for prompt delivery from his stock.

QUALITY B-RIGHT-ON PRODUCTS

THE BRIGHTON SCREW & MFG. CO.

READING RD. AT FLORENCE CINCINNATI 2, OHIO

(Continued from page 280)

cognition by the company of accomplishments of unusual merit by employes engaged in all types of work. The 95 awards involve 66 separate accomplishments, 23 of them joint accomplishments by two or more persons.

Work recognized by the awards was in the fields of radar, naval gun directors, proximity fused projectiles, electric-drive tanks, equipment for the atomic bomb project, ship degaussing equipment, turbosuperchargers, radio transmitters, aircraft armament computers, aircraft gas turbines, naval ship propulsion equipment, and many others.

Highest number of awards, 68, went to employes of the G-E Apparatus Department, largest of the company's six operating departments. The General Engineering and Consulting Laboratory received 11; Appliance and Merchandise Department, 10; Electronics Department, 3; Air Conditioning Department, 2; Chemical Department, 1.

Geographically, the awards were distributed to persons in 14 cities throughout the country.

The method of recognizing employes' contributions to engineering, manufacturing and sales activities was inaugurated in 1922 upon retirement of Mr. Coffin. The first presentation was in 1923 and was continued annually until the outbreak of the war.

Selection of the award winners is made after careful study by the company's advisory committee, on the basis of initiative, perseverance, courage and foresight. A major factor is the comparison of the achievment with the opportunity or lack of opportunity of the employe to distinguish himself with creative or constructive enterprises in the course of his daily work.

Among the award winners this year are five men who were recipients of the award in past years. Two women were among the winners this year, bringing to eight the total number of women who have been honored.

• Underwing Fueling

A procedure for fueling transport airplanes from beneath the wings at a rate nearly four times as fast as conventional wingtop methods was described before the Society of Automotive Engineers air transport engineering section by Herman O. Olson of the Douglas Aircraft Co.

Mr. Olson, a servicing equipment engineer, revealed that 100 octane

(Continued on page 284)

THE OLD-FASHIONED WAY

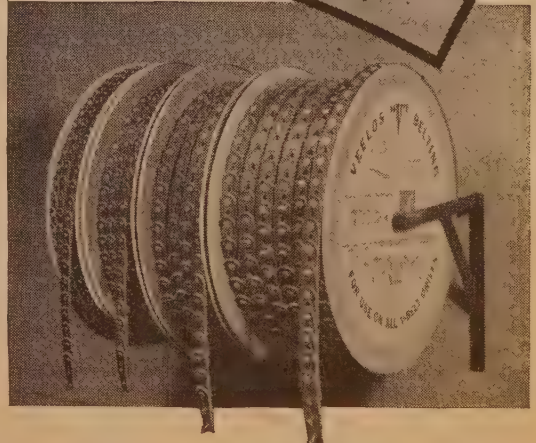
How do you stock your V-belts?

WHY stock a costly and confusing assortment of endless V-belts when you need only a few reels of Veelos, the link V-belt? With only four sizes of Veelos you can make up 316 standard sizes of endless belts. With Veelos, storing spare sets of belts for individual drives becomes outmoded. Expensive, wasteful belt inventories are eliminated . . . deterioration of spare V-belts is ended.

Veelos on reels assures a neat, orderly stockroom. Space is saved. Paper work is reduced. Any desired length of V-belt is always available. Veelos is made in all standard widths, fits all standard grooves, is packaged on standard 100-foot reels.

Veelos sales engineers are located in all principal cities; over 300 distributors throughout the country.

THE MODERN WAY



Just four reels of Veelos will provide 316 sizes of endless V-belts.

VEELOS
THE LINK
V-BELT

Adjustable to any Length
Adaptable to any Drive

MANHEIM MANUFACTURING & BELTING CO.
MANHEIM, PENNSYLVANIA

Tested • Proved • Adopted . . . by American Industry

MISSOURI

Mother of the West

THE RELATIONSHIP of the State of Missouri to the great Western reaches of America is truly that of guardian and benefactor. Missouri is the center of the Nation — a vital link between the East and West. What better industrial or commercial location could be desired?

Besides ideal location, Missouri counts among her advantages: A modern (1945) State Constitution designed to encourage industry; a vast network of transportation facilities; low taxes; abundant water supply; plentiful labor; wealth of natural resources; diversified markets; low cost power; 350 alert communities eager to cooperate; and offers as evidence of these outstanding attributes the fact that 2,663 new businesses were incorporated during the first eleven months of 1946.

Specialized, confidential service to industrialists. Write direct: Missouri State Division of Resources and Development, Dept. R-64, Jefferson City, Mo.

THE STATE OF MISSOURI

In The Heart of America

(Continued from page 282)

gasoline was pumped into the inboard tank of a Douglas DC-4 airliner at a rate of 230 gpm. This compares with an average of 60 gpm. required for fueling with present procedure.

"A series of pumping runs showed a consistent delivery of 230 gpm with an orifice pressure of five pounds psi.," Olson said.

He warned, however, that much has yet to be accomplished toward obtaining an absolutely fool-proof method of shutting off the fuel when tanks are filled.

Olson said gasoline was pumped into the bottom of a DC-4 integral wing tank through an easily-attached nozzle and a poppet valve installed in the tank. Since flow is controlled at the nozzle, it is possible for one man to fuel the airplane or for two men to fill two tanks simultaneously without climbing on the wings..

Hose attachments have been designed to meet all specifications established by the Air Transport Association, Olson said, and the rate of flow and nozzle pressure satisfy recommendations of the National Aircraft Standards Committee.

Defueling may be accomplished through the same fittings at a rate of 35 gpm through the same hose and tank fittings.

Olson told the SAE conference that during the tests, a fuel-gauge assembly was reworked to function as a switch to shut off the hydro-electronically controlled pumping equipment.

Douglas plans to explore further methods of preventing overfilling, including the use of a capacitor-type fuel gauge system as a control in automatic shut-off and the development of a rupture plate designed to burst before overfilling could cause any trouble.

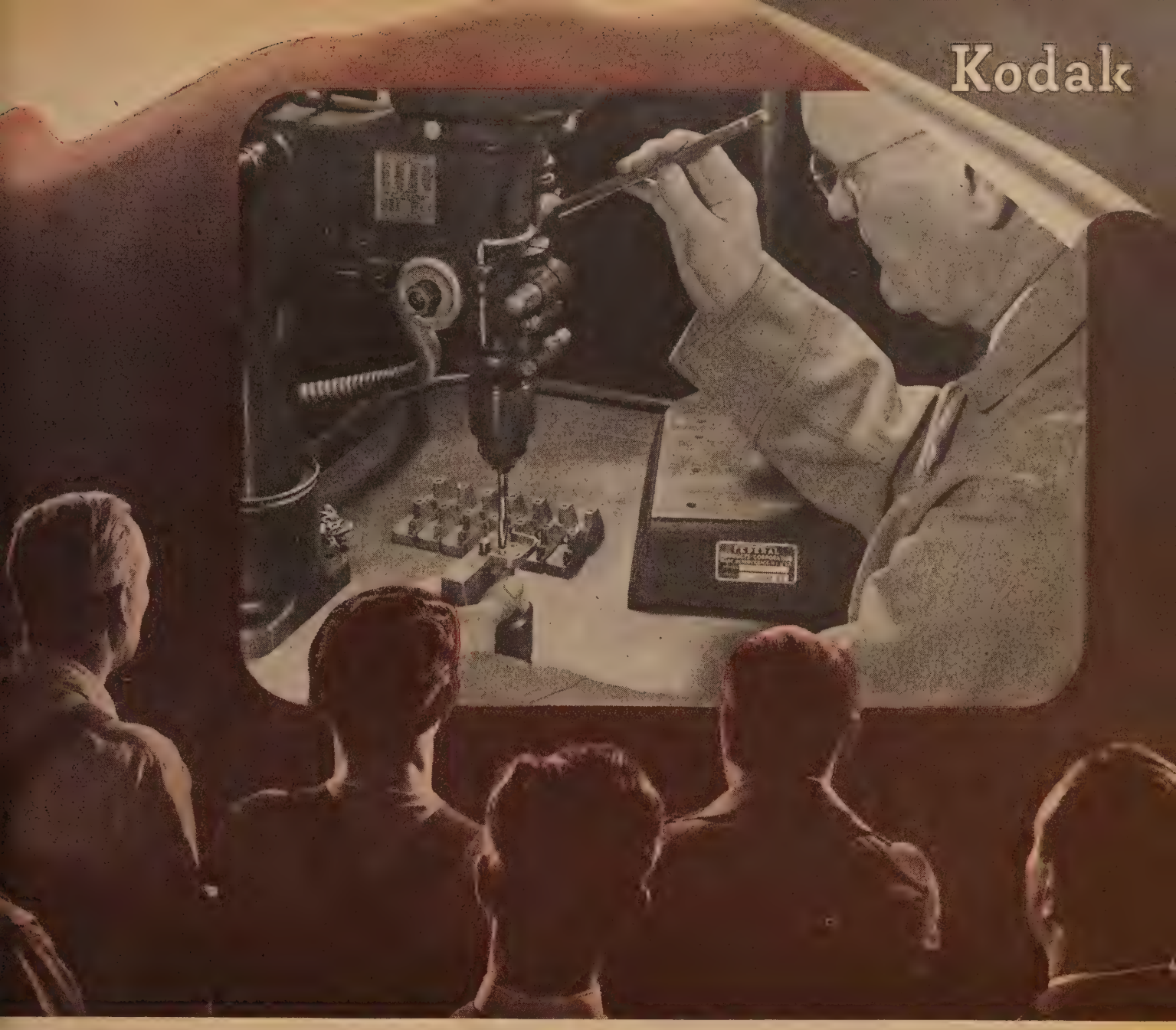
● Banks Moreland Bought

Graver Tank & Mfg. Co., Inc. of East Chicago, Ind., and Banks Moreland, Houston, Texas, have announced that Banks Moreland's tank business, formerly conducted under the name of Banks Moreland Co., was purchased by Graver Tank & Mfg. Co., Inc., and will continue to operate in the southwest as Banks Moreland Co., a division of Graver Tank & Mfg. Co., Inc. The new division will be under Banks Moreland, who has been made a vice president of the parent company.

(Continued on page 286)

"We don't use a whistle at quitting time!"

Kodak



To make your training program more stimulating, more resultful ... *use films*

IT'S EASY to "sell" a training program to workers, and to keep it "sold." Just use motion pictures or slide films.

They *arouse* interest because they're colorful. . . . stimulating . . . fresh in their approach. They *hold* it because they enable the worker to learn . . . and progress . . . so much easier and faster.

Films can help put other programs over, too

With them, you can picture unforgettably the consequences of clowning or carelessness . . . win new co-operation for your safety program. With them, you can explain complex management concepts in simple, pictorial terms . . . create better understanding between the shop and the front office.

How to get the films you need

For help in considering the hundreds of "ready-made" training films that can be rented or purchased very reasonably . . . sometimes borrowed . . . write us for a free copy of "The Index of Training Films." For help in planning and producing your own motion picture or slide film, call in a commercial film producer.

EASTMAN KODAK COMPANY
Rochester 4, N. Y.

INDUSTRIAL FILMS

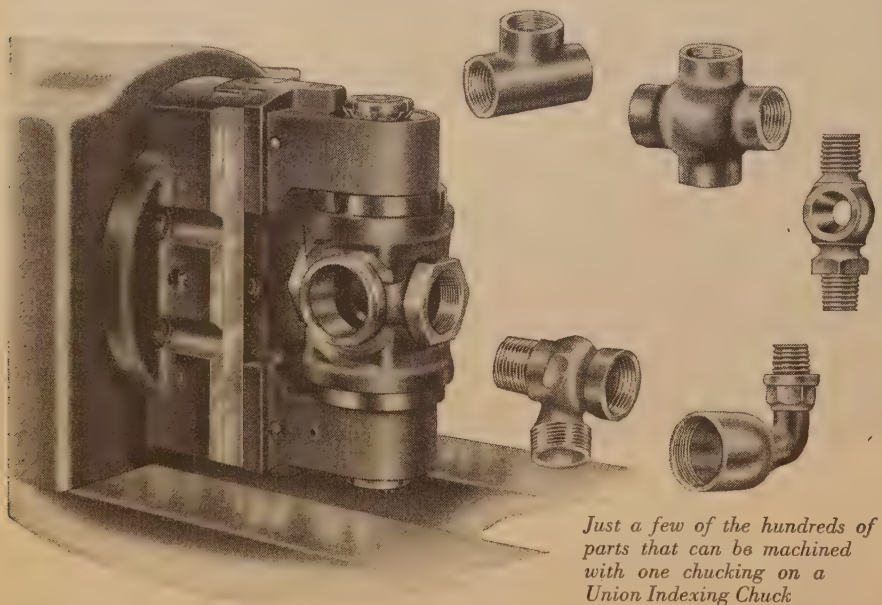
. . . another important function of photography

UNION INDEXING CHUCKS

reduce labor, machine time and fixture costs

Many plants are using Union Indexing Chucks to eliminate multiple handling of work that has more than one face or opening to be machined. They save time, machines, manpower and money in faster production of scores of products ranging from pipe fittings to airplane fuselage and engine parts.

Revolving jaws make it possible to insert the piece in the chuck once, then quickly rotate it into four or more positions for successive machining operations without backing off the jaws. Indexing chucks often pay for themselves on a single job by eliminating multiple fixtures and machines.



Just a few of the hundreds of parts that can be machined with one chucking on a Union Indexing Chuck

Jaws are mounted on radial and end thrust antifriction bearings. Index plates and latches are made of specially hardened steel. Standard indexing is for 90 degrees but can be had for any angle.

Whatever your chucking requirements, a complete engineering service and the broadest line of chucks in the world are available from UNION. Write for Catalog No. 61 for full details.

UNION CHUCKS

Chucks - Hoists - Trolleys

UNION MANUFACTURING CO.
302 Church Street
New Britain, Conn., U. S. A.

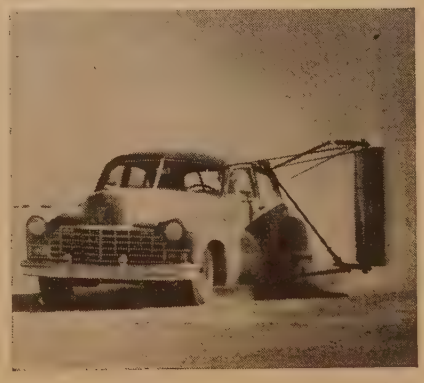
(Continued from page 284)

● **Employes Save Fellow Worker**

Six employes of the Hyatt Bearings plant at Harrison, N. J., a division of General Motors, recently received traditional awards of gold watches and safety citations from General Motors for saving a fellow employe from possible death. Pictured above, left to right, are Louis H. Gauthier, Gerald C. Graham, Henry J. Barnes, George F. Benson, Samuel F. DiFabie, David T. Moulton, GM safety director who presented the watches, and J. Warren Bryant.

Their fellow employe, Joseph Terranova, became unconscious while fighting a serious fire in the oil quench tank in the heat treat department. Messrs, Graham, Barnes and Bryant carried him outside. Although he had ceased to breathe and and there was slight indication of heart action, Messrs, Gauthier, Benson and DiFabie applied artificial respiration, learned in safety classes, to tim. Within about 15 minutes and with the aid of an inhalator, the stricken man was revived.

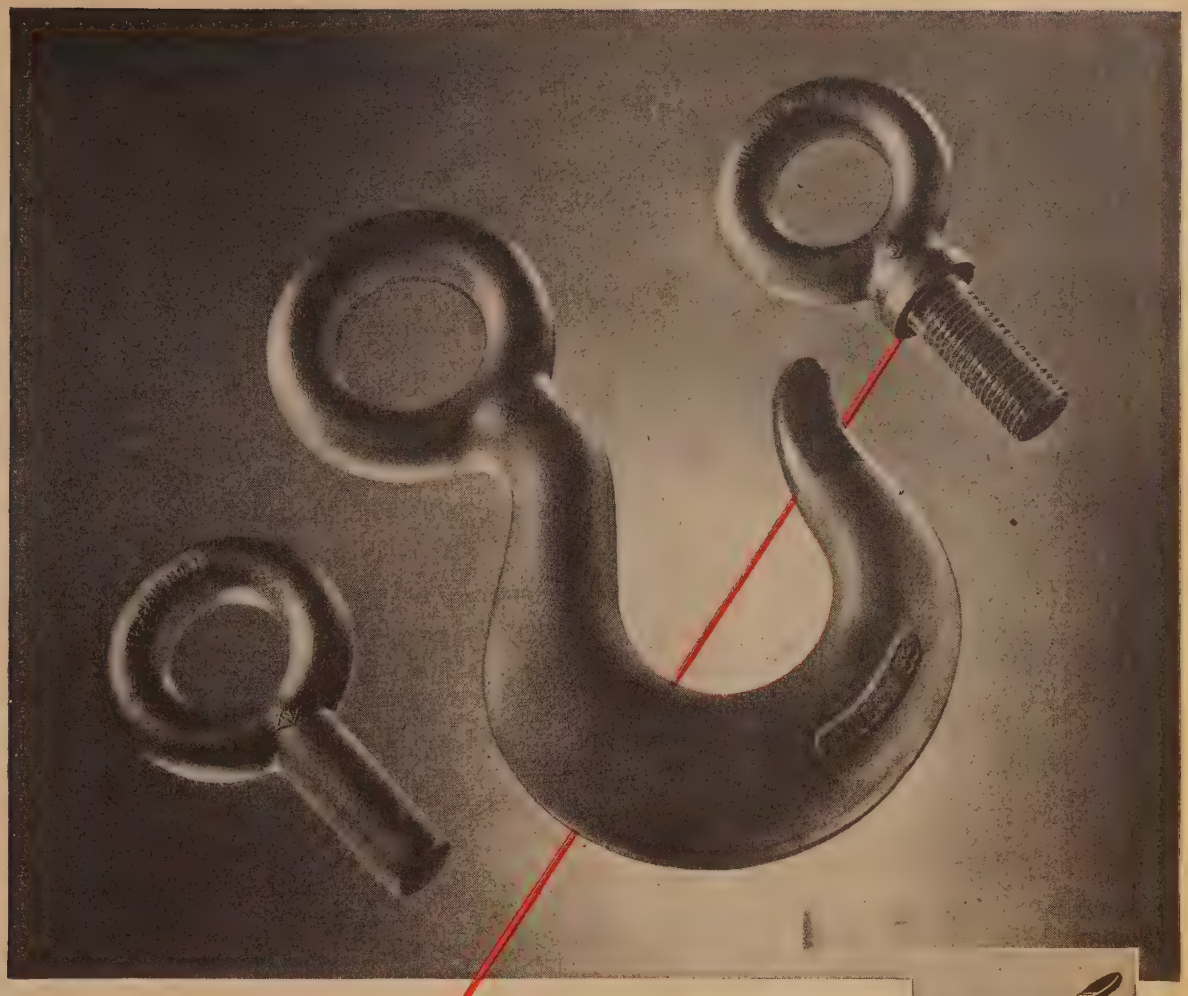
● **Automobiles Wear Wings**



Automobiles are now wearing wings.

This latest automotive style has been introduced by the United States Rubber Co. at its tire test proving grounds on a dry lake near Lancaster, Calif. By attaching a

(Continued on page 288)



Specify "Vulcan"

FOR SAFE PERFORMANCE

Not only are Williams "Vulcan" Hoist Hooks and Eye Bolts drop-forged from selected steel and specially heat-treated to provide maximum strength and toughness, but every "Vulcan" is *individually proof-tested to 50% beyond* its rated "safe working load." Each item so tested is stamped with a certifying mark. All guesswork is eliminated when you specify Williams "Vulcan" Hoist Hooks or Eye Bolts.

You can identify "Vulcan" Hooks by their orange tip. Sold by leading Industrial Distributors everywhere.

J. H. Williams & Co., Buffalo 7, N.Y.

WILLIAMS

DROP-FORGINGS AND DROP-FORGED TOOLS

Tiger Grip

The GREATEST IMPROVEMENT IN WORK GLOVES IN THE PAST TWENTY YEARS!

Entirely different from any glove intended for the same purpose! *Outwears several pairs of ordinary woven fabric gloves.* Made of specially knitted material with hundreds of "loops" in every square inch, to cushion and protect the hand. Can be washed without excessive shrinkage—and hold their shape! Treated with Johnson's "DRAX" to make them water repellent! Tested in laboratories and under actual working conditions.

Guaranteed by Good Housekeeping

Send For New CATALOG

Big, new catalog lists full line of ADVANCE work gloves including leather palm gloves, flannel gloves, wire stitched gloves, welder's gloves, etc., as well as a complete line of safety and protective clothing for every industry.

"A Better Work Glove For Every Purpose"

ADVANCE

GLOVE MANUFACTURING CO.

Dept. MF-7, 401 W. Lafayette Blvd.
DETROIT 26, MICH.

Detroit • Toledo • Chicago • Rome, Ga.

(Continued from page 286)

section of airplane wing to the side of a test car, U. S. Rubber's tire development department found that it could conduct tire tests at speeds heretofore considered impractical and unsafe.

Use of the wing section counterbalances centrifugal force, enabling the car to race around a circular track at sustained speeds of 90 miles per hour and more, without "scrubbing" the sides of its tires and with a minimum of danger to the driver.

Dr. Arthur W. Bull of Detroit, the company's director of tire development, explained that the wing section, or air foil, when attached vertically to the side of the car, develops a side thrust just as an airplane wing develops lift.

"By deflecting air, it creates a horizontal force to offset the centrifugal force which, under ordinary circumstances, would tend to pull the vehicle off its circular course. An unusual advantage is that the car stays in balance at all speeds," he said.

"Previously, on our test course, which has a radius of one mile, a car without a wing section was subjected to a continuous centrifugal force of about 300 lbs.—just as if someone on the outside of the circle were pulling the car off its course. This produced abnormal wear on the tire treads and made it difficult to obtain accurate tire tests. For safety's sake, too, it prohibited us from extending our speeds."

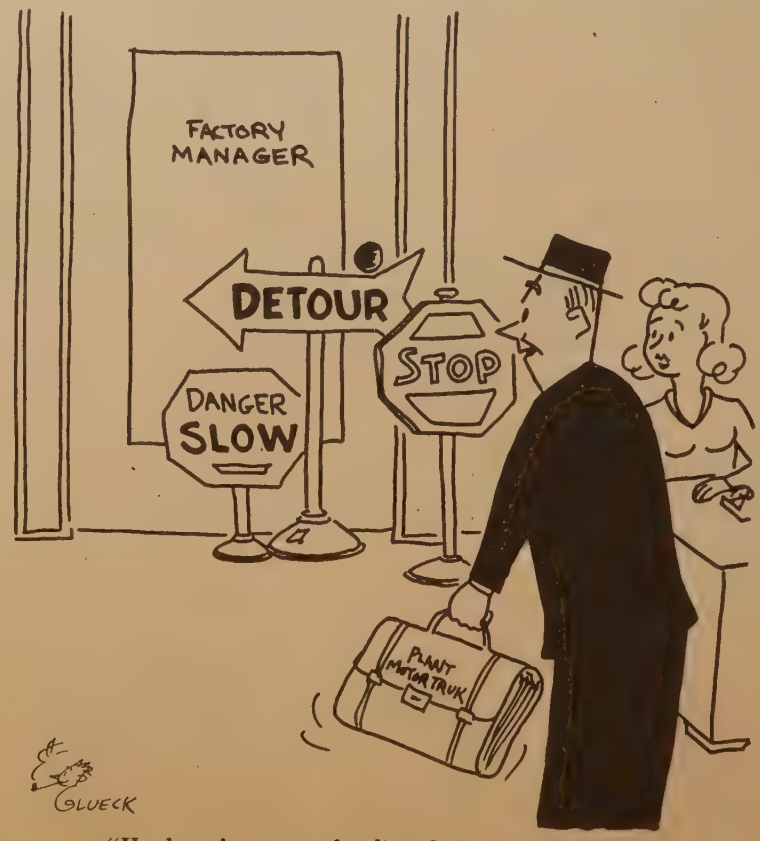
Tire Wear Found Same As On Straight Highway

Since the "wings" have been added to the test cars, tire wear on the oval course has been practically the same as would be encountered on a straight highway, Dr. Bull said.

Explaining the need for improved tire testing devices, he commented:

"As tire manufacturers, we have had to increase the speed of our test cars to develop tires that will stand up at emergency speeds greater than those ordinarily driven. Thus, passenger-car tires must now be tested at 85 or 90 rather than 60 miles an hour. We consider such speeds unsafe for continuous operation in highway testing, so we have transferred many of our operations to this dry lake, where collisions with other vehicles are impossible."

(Continued on page 290)



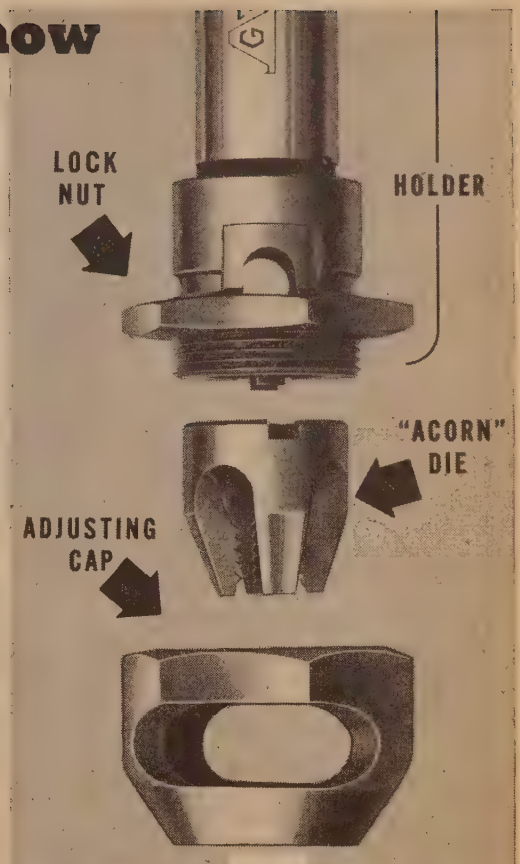
"He doesn't want to be disturbed this afternoon."

A Few Facts You Should Know About "Acorn" Dies

SIMPLE CONSTRUCTION • EASY TO OPERATE • FACTORY TESTED

To understand the operation of the "Acorn" Die, one should see it in relation to the "Acorn" Die Holder as pictured at the right in sectional view. The feature which makes the "Acorn" Die so convenient and accurate is the manner in which the four prongs or threaded lands are compressed when the holder cap is screwed down onto the holder. As all bearing surfaces on the holder and die are ground to insure correct alignment and accuracy, even pressure is brought to bear on each of the prongs simultaneously so that they all adjust equally and concentrically. This is done quickly and automatically by tightening the cap and turning up the lock nut. No other adjustments are necessary.

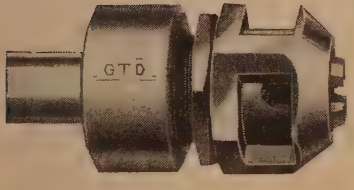
A positive adjustment to size can be obtained by using the threaded plug which comes with every "Acorn" Die. This plug has actually been threaded by the die in which it is shipped and has been carefully checked for accuracy. Thus, if it is used as a setting plug, accuracy of the set up will be assured. *For close to shoulder work, quick change over of jobs, accurate threads, specify "Acorn" Dies to your local Greenfield Distributor.*



HOLDERS ADAPT "Acorn" Dies FOR ANY MACHINE

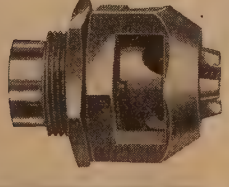
REGULAR

Regular "Acorn" Die Holder with longitudinal float which allows the die to follow its own lead independent of any lag in the machine. This holder may be used on practically all automatic screw machines and any other machines which provide for automatically reversing the die or rod at the instant when the desired length of thread has been cut.



RELEASING

Releasing "Acorn" Die Holder, while suitable for all machines, is especially recommended for hand operated machines. The improved clutch mechanism allows the holder to be released without shock.



ADAPTER

The "Acorn" Die Adapter permits the use of "Acorn" Dies with existing round die holders. It consists of three parts, a Cap to hold and adjust the die, a Lock-Nut to secure the adjustment and a Body. The shank fits round or spring die holders of corresponding size.

GTD Greenfield 75th YEAR

ASK YOUR "GREENFIELD" DISTRIBUTOR FOR 12 PAGE "ACORN" DIE BOOKLET!

GREENFIELD TAP and DIE CORPORATION • Greenfield • Massachusetts
and its New Haven Division The GEOMETRIC TOOL COMPANY

Your
SAWS
are no
better
than your
SAW FILING...
Inaccurate saw filing can ruin the cutting efficiency of the best saws, perhaps crack or break them. The machine precision of Foley Saw Filing can increase your sawing output 25% to 40%. The Foley automatically joints the saw as it is filed, making all teeth uniform in size, height, spacing. Foley-filed saws run cooler, cut fast, do beautiful work—and stay sharp longer.
30-DAY TRIAL of the Foley Saw Filer is offered—to show you what a difference Foley-filed saws can make.
FOLEY Automatic SAW FILER
FOLEY MFG. CO., 21 2nd Street N. E., Minneapolis 13, Minnesota
Please send literature on the Foley Automatic Saw Filer and details of your 30-Day Trial.
Name
Address

(Continued from page 288)

● Automatic Lift Utilized

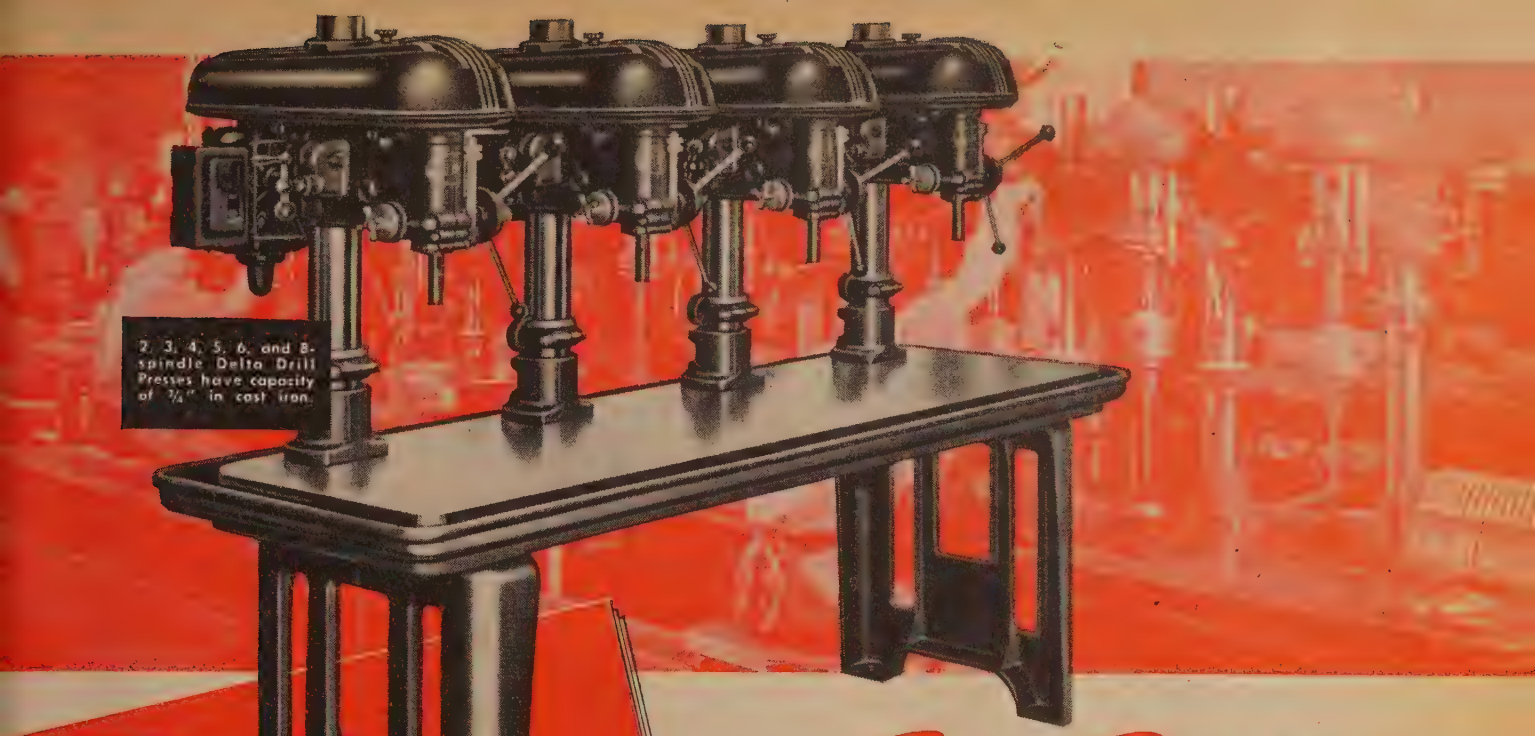
Ingenuity saves another few minutes in the race to deliver garden-fresh vegetables to metropolitan markets. The City Ice and Fuel Co., of Cincinnati, Ohio, ices produce-laden refrigerator cars in record time with this truck-mounted elevator. Strongly reminiscent of the elevating platform used on city-type public utility trucks, this automatic lift raises six 300-lb blocks of ice to car height in one load, thus cutting to a minimum manual labor and time required for the icing operation. The Mack truck with its special body speeds loads of forty-six 300-lb. cakes of ice from manufacturing plant to railroad yards.

● A Master Shoemaker

U. S. Army paratroops and ski troops may have taken the highly specialized boots they wore pretty much for granted, but they have a quiet, thoughtful man of 67 in Windsor, Vt. to thank for assisting in the development of their efficient footgear.

T. F. Crimmin, shoe technician for Goodyear Tire & Rubber Company's shoe product subsidiary, The Windsor Manufacturing Corp., in Windsor, is the man who played an important part in development of paratroop and ski boots and his

(Continued on page 292)



Free Bulletin on Delta* 17" Drill Press

Gives you detailed information, to keep you posted on one of the industry's most complete lines of low-cost manual and power feed units

There's a low-cost Delta 17" Drill Press to meet just about every requirement. This handy bulletin helps you do a creditable job of selecting the *right* machine for a specific job:

It describes Delta Multiple-Spindle Drill Presses that are furnished with one-piece tables — or with sectional tables that permit a wide variety of production combinations.

It describes Delta Power Feed Drill Presses that provide eight rates of feed for each spindle speed, so that the correct rate is always available.

It describes Delta Single-Spindle Drill Presses with standard tilting tables, production tables, or production tables and foot feed.

It describes the Delta Slo-Speed* Attachment, for use where extra-slow drill press operation is necessary for spot facing, reaming, counterboring, core drilling, and drilling of hardened parts.

It describes famous Delta construction features that have helped to make Delta Drill Presses popular in shops where low first cost, low maintenance cost, and trouble-free performance are important.

Send for free copy of this informative bulletin today. Use coupon below.

Or, ask your Delta distributor for further details on Delta 17" Drill Presses. He is listed under "Tools" in the classified section of your telephone directory.

Delta Manufacturing Division
Rockwell Manufacturing Company
Milwaukee 1, Wisconsin

*Trade Mark Reg. U. S. Pat. Off.

ROCKWELL DELTA MILWAUKEE

WM-14

TEAR OUT COUPON AND MAIL TODAY!

DELTA MANUFACTURING DIVISION
6208 E. Vienna Ave., Milwaukee 1, Wisconsin

Send me a free copy of Bulletin A-17 on Delta 17" Drill Presses.

Name.....

Position.....

Company.....

Address.....

City.....(.....) State.....

PROTECT EYES WITH
WILLSON CUP GOGGLES

Two way ventilation inside lens through side screen and slotted ring keeps fogging to minimum.

The tougher the job, the more your men will appreciate the dependable protection of WILLSON RR50 cup goggles.

Heat treated Super-Tough* lenses in durable plastic eye cups, provide both front and side protection against steel chips, splashes of molten metal and similar hazards encountered in chipping, riveting, casting and such occupations. A specially designed resilient spacer ring under the lens provides a greater factor of safety when the lens is subjected to severe impact.

For utmost comfort in a goggle of this type, the eye cups are molded to fit the eye cavities. The nose bridge can be adjusted for correct spacing between the eye cups and does not ride the nose, while snug fit without pressure is assured by an adjustable headband. Dual ventilation gives through draft by means of a perforated sideshield, and over the lens surface through a slotted retaining ring.

*T.M. Reg. U. S. Pat. Off.

For help on eye protection problems get in touch with your Willson distributor or write direct to Willson Products, Inc., 215 Washington St., Reading, Pa.

DOUBLE WILLSON
PRODUCTS INCORPORATED
READING, PA., U.S.A. Established 1870

(Continued from page 290)

contribution to the war effort was not accidental.

Master Shoebuilder Crimmin's father was a shoe craftsman and foreman of a prominent New England shoe company, when he was a young man. Mr. Crimmin's grandfather was a master shoemaker and it was on his knee, as a small boy, that the present day master began to learn his trade.

Before he was 10 years old, Mr. Crimmin knew the fundamentals of shoe building and repair. Before he was 21 he had learned to master every machine employed in shoe manufacture and had handled important jobs in large shoe factories.

For several years after reaching his majority he worked as a utility man with shoe manufacturers because of the versatility of his knowledge and experience which made it possible for him to take over any machine or operation in the industry when the occasion demanded.

In September, 1918, Mr. Crimmin was employed by Goodyear, at Boston as a shoe manufacturer's representative for the company. A few months later he went to Akron to attend a training school and quickly demonstrated his mastery of shoebuilding techniques, with the result that he was assigned to shoe products development and remained in Akron for 19 years in that department.

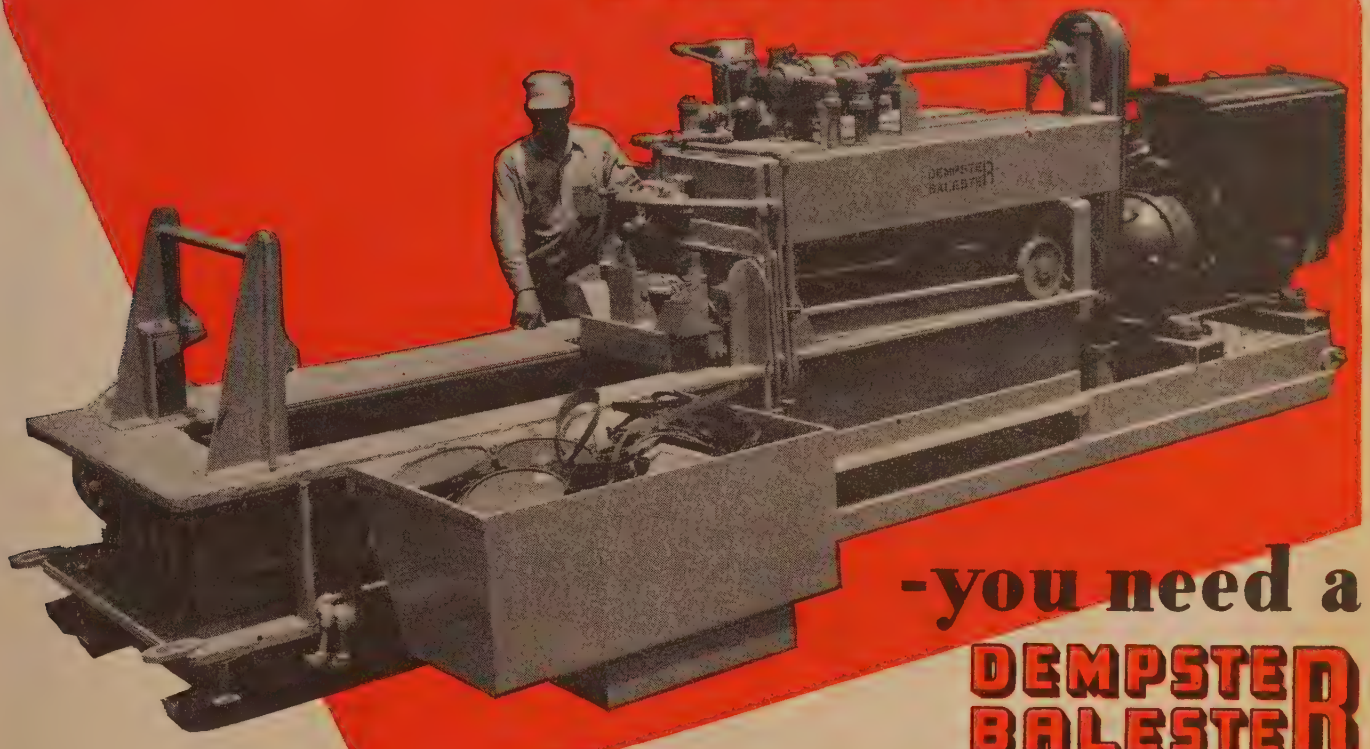
When Goodyear established the Windsor Manufacturing Corp., as a shoe products factory in 1936, Mr. Crimmin was assigned to the new plant as shoe technician and has been there since, constantly working on improvement of products and advancement of shoe manufacturing operations.

When it was decided to construct paratroop and ski boots with leather midsole and rubber soles and heels, U. S. Army representatives visited the Windsor plant and consulted with executives of the company who immediately called in Mr. Crimmin and gave him the task of assisting in the design of best possible soles and heels for the boots and methods of constructing them.

Doing the initial work by hand, he devised means of improving production methods so well that ultimately the Windsor plant was awarded the contract to manufacture all of the rubber heels and soles that were used on paratroop and ski boots for United States army paratroops and ski soldiers.

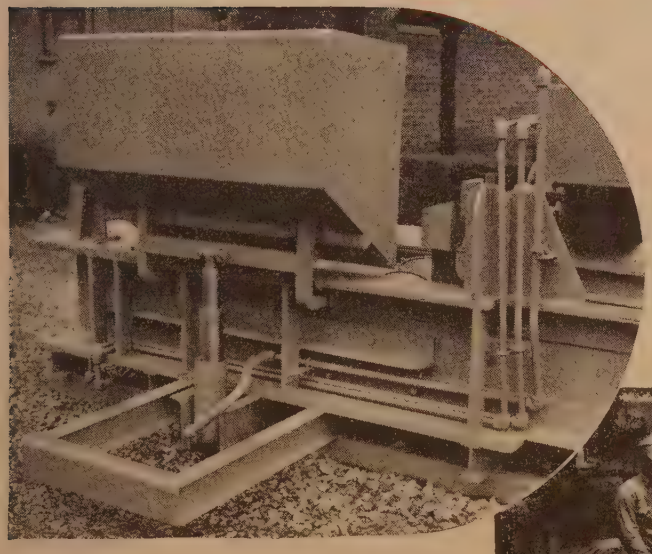
(Continued on page 294)

If you handle SCRAP METAL



-you need a DEMPSTER BALESTER

TRADE MARK REG.

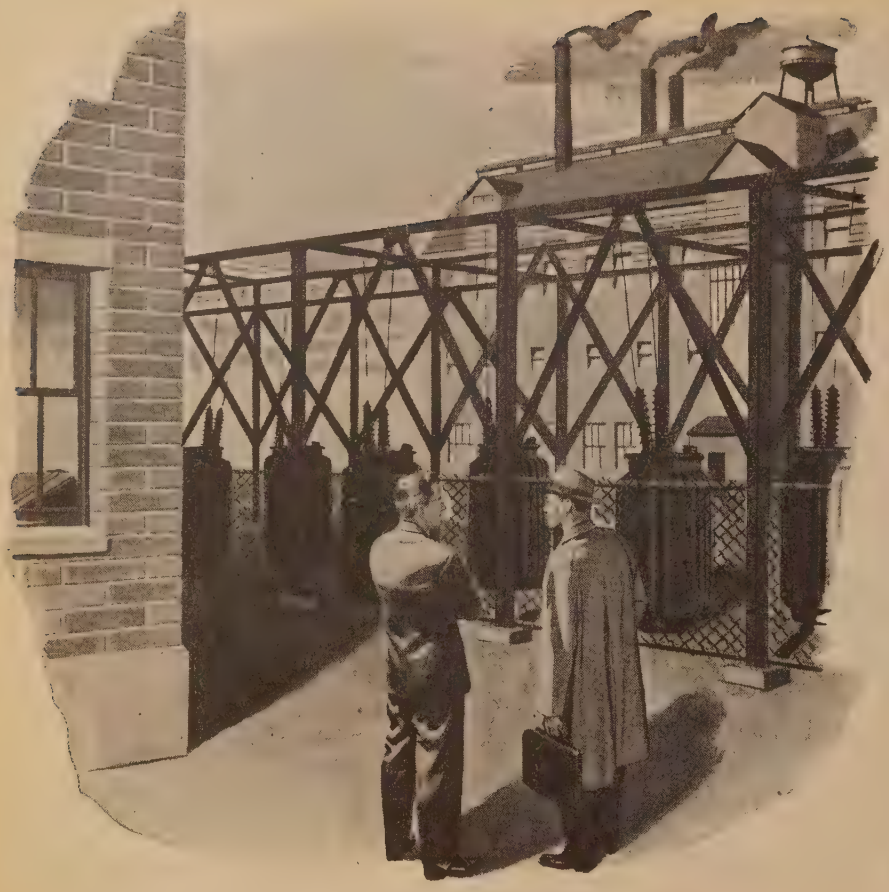


Shown above, top, the Dempster-Balester, Model 125, complete with Diesel Powered Motor. Above, the Skip Pan Loader fills the charging box, note the compact space saving construction of the loader, and the simplicity of the hydraulic dumping mechanism. Right, front view of the Balester with charging box full and loading pan ready for reloading.

This compact Dempster-Balester, Model 125 portable press, handles any type of scrap metal, no pits or foundations necessary—just place it where needed and it's ready to deliver dependable service for you. Designed for rugged every day service, with all points of strain built oversize to withstand internal stresses beyond the normal need of baling. Charging box is squared and completely lined with abrasion plates with all high spots and toughness machined off. Powered by Electric Diesel or Gas Motors, the Dempster-Balester, equipped with the efficient Skip Pan Loader, is setting increased production records everywhere. Delivers a high density, 125 pound bale that is easily handled from baler to furnaces.

For heavier work and larger bales, investigate the Dempster-Balester Model 275. A powerful baling machine that delivers approximately 275 pound bales. Write or wire today for complete information.

DEMPSTER BROTHERS, INC., 227 Springdale, Knoxville 17, Tennessee



"For outdoor fire hazards like this, a wheeled extinguisher is a must!"

Inside your plant, but *outside* its building walls, there may be a fire-danger spot that's beyond the range of your present extinguishing equipment. Outdoor transformers, for example. Or flammable liquid storage tanks.

Why not discuss these hard-to-reach spots with a Kidde representative? Chances are, you'll find they can be effectively protected with a *Kidde* Wheeled Extinguisher.

It covers ground fast, maneuvers easily at the scene of action. Discharging dry, clean carbon dioxide, it smothers blazes fast . . . has ample capacity for protecting serious hazards.

And while you're talking to the Kidde representative, discuss your special indoor hazards with him too. His fire protection knowledge may be helpful to you in many ways—and it's always at your disposal.

Walter Kidde & Company, Inc., 240 Main St., Belleville 9, New Jersey

The word "Kidde" and the Kidde seal are trade-marks of Walter Kidde & Company, Inc.

Kidde

FIRE PROTECTION HEADQUARTERS

(Continued from page 292)

● Evans Receives Army Award

The War Department has announced the award of the Army Certificate of Appreciation to Walter Evans, vice president in charge of all radio activities for the Westinghouse Electric Corp., for "his contribution to the Signal Corps in connection with the development and production of radio and radar equipment during World War II."

Under the direction of Mr. Evans more than $400,000,000 worth of wartime electronics equipment was produced by Westinghouse in filling Army and Navy contracts for 50 major products, including radio and radar equipment such as long range land based aircraft warning radar, mobile anti-aircraft gun control radar units, electronic proximity fuses, air borne search radar, long range marine search units and still secret x-ray equipment for the atomic bomb project.

● Insecticide Dusters Shipped

Insecticide dusters, made by the Naco Manufacturing Co. of Huntington Park and purchased by the Brazilian Government, are shown as loaded at Mines Field by Mercury Airfreight Corp. for flight to Rio de Janeiro. On hand to witness the loading were, left to right, J. E. Evans, vice-president, Naco Mfg. Co.; R. W. Plouf, traffic manager, Naco Mfg. Co.; Betty Mann, Flying Tiger's secretary; W. L. Thompson, vice-president Mercury Airfreight Corp.; Frederick M. Blow, president Mercury Airfreight Corp.

Insecticide dusters to combat a scourge of locusts sweeping Brazil made up a 9100-lb. air shipment loaded by Mercury Airfreight Corp. at Mines Field, Los Angeles.

Purchased by the Brazilian Government, two types of the Root dusters manufactured by Naco Mfg. Co. of Huntington Park were

(Continued on page 296)

MANHATTAN *OIL-PROOF* CONVEYOR BEL

MADE WITH FLEXLASTICS

. . . unaffected by oil-treated coal or coke

Paranite Oil-Proof Conveyor Belt carrying oil-treated coal in an illuminating gas plant

The first all-synthetic belt made for conveying coke was installed in 1936. was made by Manhattan . . . and today after ten years, this original Manhatta Paranite Conveyor Belt is still on the job. This is due to Manhattan engineerin in Strength Members and FLEXLASTICS to produce a conveyor belt to tak abrasion and oil, while retaining its long life and elasticity.

Other installations of Paranite-G.O.P. (Gas-Oil-Proof) Conveyor Belts hav been in successful operation for record periods in power stations, gas work brick and tile, coke, asphalt, chemical and similar plants where oily substance are encountered.

Photograph below shows the first Paranite-G.O.P. Conveyor Belt 10 yea old and still carrying coke to the top of a truck-loading hopper where oil sprayed on the coke. A Paranite Oil-Proof Conveyor Belt will do equally we for you. Make your next a Manhattan Conveyor.

FLEXLASTICS is an exclusive MANHATTAN trade mark. Only MANHATTAN can make FLEXLASTICS.

RAYBESTOS-MANHATTAN, INC

MANHATTAN RUBBER DIVISION

EXECUTIVE OFFICES AND FACTORIES PASSAIC, NEW JERSE

14 ADVANTAGES

1. Not affected by oil
2. Will not soften
3. Cover will not swell, buckle or peel
4. Less coal spillage
5. Runs straighter on idlers
6. Less ply separation
7. Flexes better over small pulleys
8. Resists abrasion
9. Resists destructive effects of heat better
10. Non-spark
11. Mildew-proofed fabric
12. Increases production
13. Has longer life
14. Reduces cost

the NEW
HOFFMAN
DISC FILTER

Inlet and outlet holes threaded to receive 1¼" pipe for dirty and clean coolant lines. Overall height 11"; outside diam. 7½"; weight 7½ pounds.

HAS THESE
OUTSTANDING
FEATURES

- LOW INITIAL COST
- OCCUPIES LIMITED SPACE
- NO MOVING PARTS
- EASY TO CLEAN
- EASY TO INSTALL

The Hoffman Disc Filter can be installed either singly or in units and delivers a continuous flow of clean coolant. Ideal for use where space is limited and low initial cost is a factor. The removable disc element can be quickly and easily cleaned and re-used. Maintenance costs are kept at an absolute minimum.

The Hoffman Disc Filter will remove dirt particles measuring from 3 to 5 micro inches and is being successfully used on screw machines and thread rolling coolants, diesel engine lubricating oils, hydraulic oils and various wash oil applications.

★ SEND FOR LITERATURE

U. S. HOFFMAN MACHINERY CORPORATION
215 Lawson St., Syracuse 6, N.Y.
COOLANT FILTERS • FILTRATION ENGINEERING SERVICE

(Continued from page 294)

included in the shipment. Both shoot a controlled volume of dust at high velocity. The smaller, a hand-operated model carried by a strap over the shoulder, has a capacity of 7½ lbs. and affords exceptional accuracy. The larger, tractor-mounted model, of 25-lb. capacity, is powered by a 2 hp engine and drives the dust over a wide area.

● Lasser's New Company

Jack Lasser, founder and president of Mastercraft Electric Co. of Newark, N. J., has resigned the presidency of and sold his interest in the company to start a new organization.

The new company, the Lasser Mfg. Co., will enter production on a complete line of modern fluorescent lighting fixtures and lamps. General offices will be located at 40 N. E. 22nd St., Miami, Fla.

● Company Changes Name

The American Foundry Equipment Co. has announced a change in its name to American Wheelabrator & Equipment Corp. The change was made as a matter of convenience to the trade in more closely associating the company with its product, the Wheelabrator, and to provide a name that would embrace other company products and new development of industrial application, particularly in the field of dust and fume control.

● Chess Goes Mechanical

Twentieth century technology has moved into the ancient game of chess in this unique set devised by Henry A. Sherwood in cooperation with the SKF ball and roller bearing firm. Using complete bearings for kings, Sherwood removes the outer rings to form queens and makes bishops, knights, castles and pawns from other bearing parts. Af-

(Continued on page 298)

Spare Parts and Maintenance Problems Simplified

Recognizing the need for simplification in ordering and stocking Spare Parts for Electrical Control Apparatus, The Clark Controller Co. publishes very complete Spare Part Data Sheets. Shown first is a numbered picture of each part necessary to build the complete device—an exploded view of the apparatus. A complete description of each part is then given in a numerical list which corresponds with the numbers on the picture. The correct part number is also listed.

Parts recommended to stock—recommendations based upon indexing thousands of orders over many years—are indicated. Complete, detailed ordering instructions are given, as well as terms of sale.

There is no hunting for the name, number, or designation of the part you want. Simply locate the part on the picture, find the number in the numerical listing and read across the page.

MAINTENANCE AND INSTRUCTION SHEETS, giving helpful information for installation, adjustment and maintenance of "3C" apparatus have been compiled.

COIL DATA SHEETS giving complete "at-a-glance" information on voltage, cycle, poles and Bulletin number for every "3C" magnetically operated device, aid materially in selection of magnet coils.

The use of all these sheets (available to all users of Clark Control) simplify Installation, Adjustment, Maintenance, and spare part problems.

EVERYTHING UNDER CONTROL

THE CLARK CONTROLLER CO.

1146 EAST 152nd STREET, CLEVELAND 10, OHIO

Easy Lifting...

'Budgit' Chain Blocks embodied the first revolutionary improvements made in 50 years of chain block manufacture. Our aim in making them was light weight and easy lifting. 'Budgit' Chain Blocks have both!

'Budgit' Chain Blocks are the first chain blocks light enough for a man to lift and carry from one job to another! The first that one man, by himself, could hang up, position for lifting, and then lift the load.

These portable, hand-operated chain blocks come in four sizes capable of lifting 250, 500, 1,000, 2,000, and 4,000-pound loads. If you have spot-lifting jobs around your plant, install a 'Budgit' Chain Block to do the lifting. You'll increase your production, make your workmen happier, and receive good dividends on your investment.

Write us for a copy of Bulletin No. 367 for complete information on 'Budgit' Chain Blocks.

Sizes to lift ¼, ½, 1, and 2-ton loads.

MAXWELL MANNING MOORE INC. MM

'BUDGIT' *Chain Blocks*

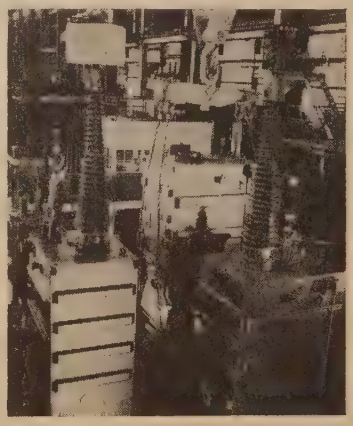
MANNING, MAXWELL & MOORE, INC.
MUSKEGON, MICHIGAN

Builders of 'Shaw-Box' Cranes, 'Budgit' and 'Load Lifter' Hoists and other lifting specialties. Makers of Ashcroft Gauges, Hancock Valves, Consolidated Safety and Relief Valves and 'American' industrial instruments.

(Continued from page 296)

ter special sets were presented to President Truman, King Gustav of Sweden, Navy Secretary Forrestal, Air Force General Spaatz and others, Sherwood received so many orders that his unusual hobby is now a flourishing business in New York.

● Greater Voltages Than Ever



Three transformers, built to step up electric current to as much as 500,000 volts—nearly 75% greater voltage than that now carried by any transmission line —are shown in the test pit of Westinghouse Electric Corporation's Transformer Division here. The transformers, each 37 ft. high and with extra heavy insulation to withstand the as-yet-untried transmission voltages, are being built for the American Gas & Electric Service Corporation's experimental line near Brilliant, Ohio. The A. G. & E. test seeks to determine the feasibility of transmitting electric power longer distances at greater voltages than ever before attempted. A 287,000 volt line, the highest voltage line now in existence, can transmit power approximately 250 miles.

● Fuel Oil Laboratory

The placing in operation of one of the nation's largest and most modern fuel oil laboratories has been announced by Gulf Oil Corp.

Officials of the corporation at the same time forecast a national increase of at least 50% in home heating by oil by 1950.

The laboratory, an addition to the corporation's extensive research plant at Harmarville, Pa., will be devoted to developing greater efficiency in home oil heating.

Public acceptance of oil heat has grown tremendously in the past quarter century. While in 1920 only

(Continued on page 300)

Penco

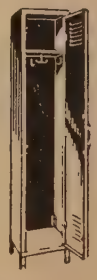
steel storage equipment

Reduces Loss

Caused by fire, vermin, dust, and theft.

For the permanent protection of tools, parts, assemblies, personal clothing and supplies of all kinds, replace makeshift facilities with *new PENCO Steel Storage Equipment.*

LOCKERS



- Help maintain employee morale.
- Provide for safe, sanitary storage of clothing and personal effects.
- Help promote orderly "factory-keeping."

CABINETS

Tool and Storage

Time-saving and convenient machine tool accessories.

- Efficient storage for tools, parts, gauges, instruments, supplies.

SHELVING

- Provides for controlled handling and storage of tools, parts and assemblies.
- Simplifies storekeeping.
- Reduces losses and breakage.
- Saves floor space — allowing extra room for productive purposes.

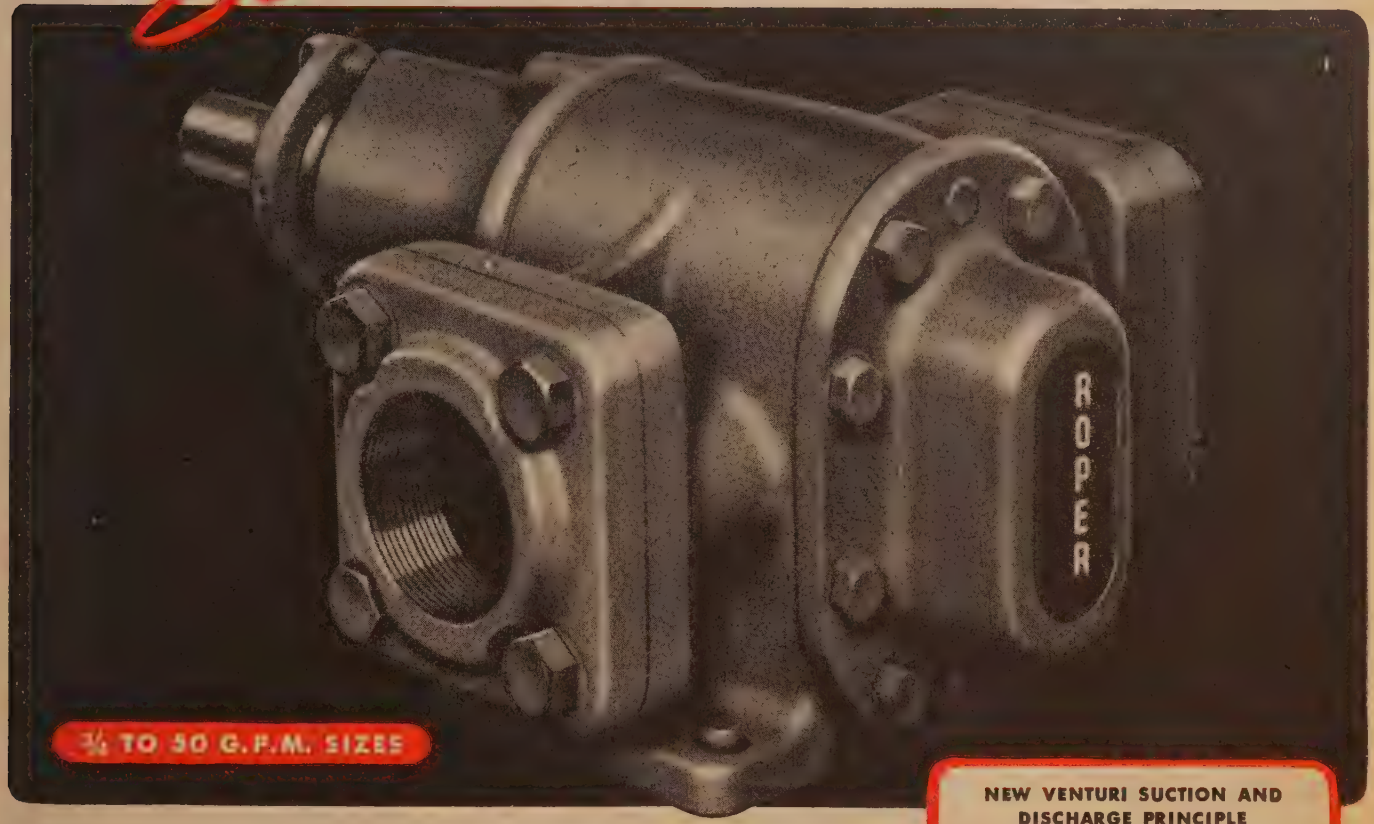
1869 Penco FOR PERMANENCE

Write for Catalog and free engineering service. Kindly state the type of equipment required.

Penn Metal Corporation of Penna.

In Business Continuously Since 1869
L. LEWIS SAGENDORPH, Founder, 1869-1909
66 Oregon Avenue, Philadelphia 48, Pa.

NEW Series "K" ROPER ROTARY PUMPS



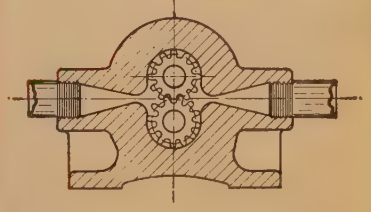
HUB, FLANGE, OR FOOT MOUNTED FOR BELT, CHAIN, OR DIRECT DRIVE

Embodying the new Roper venturi suction and discharge principle, the new Series "K" pumps are rugged, compact units that save space and reduce power costs. Liquid to the pumping gears is properly accelerated, then decelerated, improving operating efficiency and the ability of the gears to handle a wide range of viscous liquids at standard motor speeds without changing pump size to avoid cavitation and noise. Roper pumps have a high suction lift . . . are unusually quiet and operate efficiently in either direction.

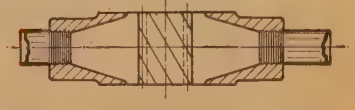
They are precision built, self-lubricated by the liquid pumped, and adaptable to a wide range of jobs . . . pressure lubrication, hydraulic service, fuel supply or transfer work pumping clean liquids. Equipped with mechanical seal or packed box, with or without relief valve. May be direct connected, belt or chain driven. Interchangeable mounting brackets and adapters . . . provisions for either hub, flange, or foot mountings.

NEW VENTURI SUCTION AND DISCHARGE PRINCIPLE

(Patent Pending)



WHAT IT IS: An entirely new design application giving results unachieved with conventional pump designs. From the outside of the case the two ports are elongated, tapered openings extending to and across the full center area of the gear bores. It is a proportional means by which liquid velocity is kept in step with the velocity of the pumping gears.



WHAT IT DOES: Causes the liquid to pass through the pump with a minimum of energy loss from turbulence, friction, and cavitation. Provides a uniform distribution of liquid across the gear face increasing efficiency by reducing recirculation losses. Adds quietness and reduces power cost. Provides the means for handling a wider range of viscous liquids at standard motor speeds

ROPER Rotary Pumps

Get all of the Facts

Send For Free Folder

Complete details, including: specifications, exploded view of construction features, and wide range of mounting conditions, will convince you that Roper Series "K" Pumps insure a fast, dependable solution to pump application problems.

SEE OUR CATALOG IN SWEET'S

Other Models up to 300 G.P.M., Pressures up to 1000 P.S.I.

GEO. D. ROPER CORPORATION, 282 BLACKHAWK PARK AVE., ROCKFORD, ILL.

CORBIN

A name famous in the metalworking industry

CORBIN

SCREW... Known wherever fastening devices are used, for excellence and uniformity in Wood Screws, Sheet Metal Screws, Machine Screws, Stove Bolts — both CORBIN-PHILLIPS and CORBIN-Slotted — also Nuts, Drive Screws, Set Screws, Escutcheon Pins . . . Chain.

CORBIN

SCREW MACHINE SPECIAL PRODUCTS

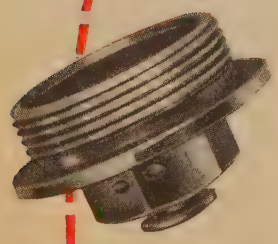
MILLED FROM BAR

Known throughout the metalworking industry as one of the largest producers of special products milled from bar or cold-headed blanks. In over 200,000 square feet of floor space, thousands of machines permit every primary and secondary operation needed to assure full compliance with specifications, plus rapid and economical production.

CORBIN equipment includes hundreds of single- and multiple-spindle automatics . . . batteries of grinders for centerless, cylindrical, internal and thread grinding . . . solid and open-die headers . . . lathes, milling and drilling equipment . . . departments specializing in precision rolled thread . . . heat-treating, plating, polishing . . . all subjected to step-by-step rigid inspection that promotes acceptance and speeds production *for you.*

You know CORBIN . . . you know CORBIN-SCREW . . . it will pay you to know CORBIN SCREW MACHINE SPECIAL PRODUCTS for the manufacture of small parts, inspected and ready to go into your assemblies.

P-73



CORBIN SCREW DIVISION
The American Hardware Corp.
NEW BRITAIN
CONNECTICUT

CORBIN

COME TO CORBIN FOR SCREW MACHINE *Special Products*

(Continued from page 298)

7,500 homes were heated by oil, today more than 2,500,000 American dwellings use oil furnaces, Gulf officials reported.

Thirty per cent of persons planning new homes expect to heat by oil, the Corporation estimates. Burner manufacturers were said to be estimating demand for burners will run as high as 500,000 yearly for the next five years.

The new laboratory will deal with problems of increasing efficiency, adapting fuels of new cracking processes to burner operation, overcoming problems of corrosion, improving atomization, and assisting in development of better fuels.

Results of studies on burner operations and adjustments will be made available to dealers and to manufacturers of burner equipment while fuel improvements will be incorporated in the marketable oils as they are developed.

• New Department Formed

Ray A. Obrecht

Formation of a Process Engineering Department, headed by Ray A. Obrecht, for the past seven years with Progressive Welder Co., Detroit, Mich., has been announced by that company.

According to John D. Gordon, general manager of Progressive, the creation of this department is a natural evolution in the resistance welding field. For some years, now, Mr. Gordon says, Progressive Welder has been called on increasingly to provide process engineering service wherever resistance welding was being considered as a means of fabrication.

He points out that the vital importance today of cutting manufacturing costs, while paying high wages to labor, puts added emphasis on the desirability of using resistance welding in the fabrication of

(Continued on page 302)

For trouble-free flow control ..... install POWELL Valves

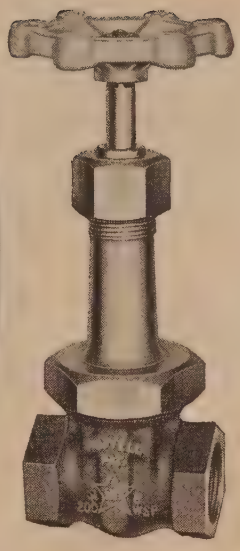


Fig. 375—200-pound Bronze Gate Valve with screwed ends, inside screw rising stem, union bonnet and renewable, wear-resisting "Powellium" nickel bronze disc.

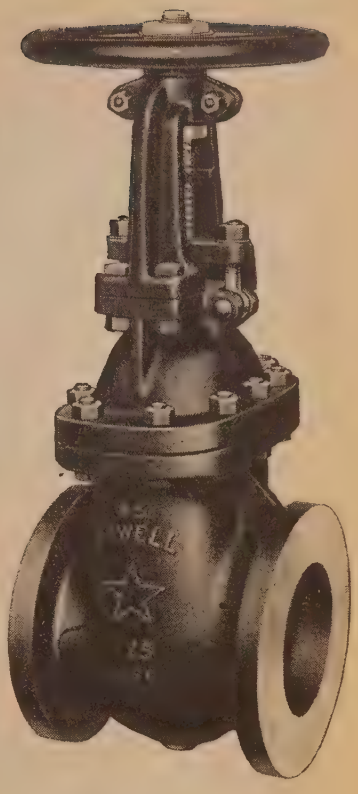


Fig. 1793—125-pound Iron Body Bronze Mounted Gate Valve with flanged ends, outside screw rising stem, bolted flanged yoke, bronze seat rings and taper wedge solid disc. Also available in All Iron.

There are at least two notable reasons why Powell Valves minimize flow control troubles. One is that every valve in the Powell Line has been scientifically designed to operate under certain specific flow control conditions—pressure, temperature and/or media. The other is that there's a Powell Valve for *every* operating condition, or set of conditions, known today.

That's why so many plants, representing every phase of modern industry, are now standardizing on Powell Valves.

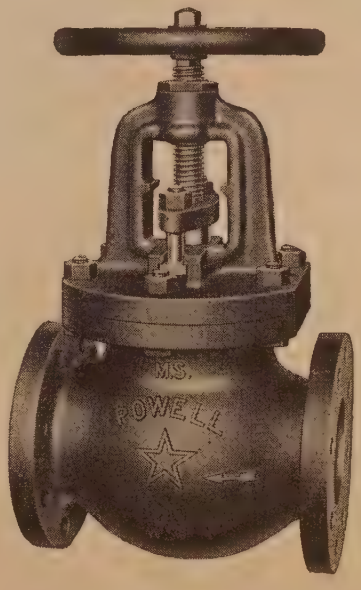


Fig. 241—125-pound Iron Body Bronze Mounted Globe Valve with flanged ends, outside screw rising stem, bolted flanged yoke and regrindable, renewable bronze seat and disc. Also available in All Iron for process lines.

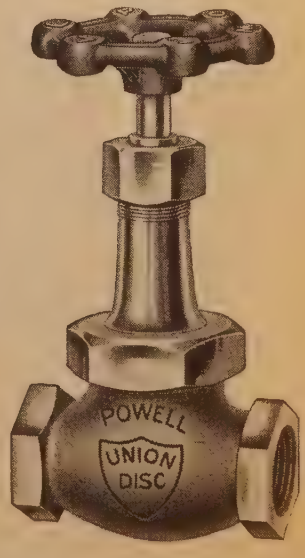


Fig. 150—150-pound Bronze Globe Valve with screwed ends, union bonnet and renewable composition disc.

Fig. 190—150-pound Iron Body Bronze Mounted "Irenew" Globe Valve. Has screwed ends, union bonnet and regrindable, renewable wear-resisting "Powellium" nickel-bronze seat and disc.

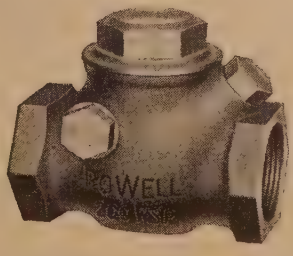


Fig. 560—200-pound Bronze Regrinding Horizontal Swing Check Valve. Screwed ends, screwed-on cap and regrindable, renewable bronze disc.

The Wm. Powell Co., Cincinnati 22, Ohio

DISTRIBUTORS AND STOCKS IN ALL PRINCIPAL CITIES

POWELL VALVES

• Glove No. 2 will last 16 times as long on a grueling job because it has extra protection

That's what a Chicago die casting firm discovered when it called in a Bauer & Black Technical Consultant for help. Gloves used in handling rough castings were wearing out in half an hour! The Consultant recommended wrapping them with Industrial Adhesive Tape No. 270.

On trial, the wrapped gloves lasted 8 hours! On other jobs, glove life was extended from two to thirty days. What's more, the workmen's hands were spared, production was speeded and savings mounted.

HOW CAN TAPE SERVE YOU?

If you have a "protection" problem—or a packaging, weatherproofing, insulating, or bundling problem—it's a good bet a Technical Consultant can help you iron it out, free! Industrial Adhesive Tape serves so *many* uses, and hundreds of industries have benefited by this free service. To have him call, write Dept. 102 today—and don't forget to ask for our free monthly Automotive News Letter; you'll enjoy it.

Products of

BAUER & BLACK

Division of The Kendall Company, 2500 S. Dearborn St., Chicago 16

Industrial Adhesive Tape

PRESSURE SENSITIVE

Production Short Cuts to Reduce Costs • Research to Speed and Improve Methods

(Continued from page 300)

metal products. Further, the emphasis is more on special machinery—designed to do a specific job or class of job—at minimum cost in the minimum time, rather than on standardized types of resistance welding machines.

The new Progressive Welder Process Engineering Department functions in several ways. It is set up to:

1. Consult on experimental designs, for weldability.
2. Consult on product design to insure suitability for welding.
3. Assist in detailing the product.
4. Plan the processing method and recommend the general type of equipment to be used. This includes planning the sequence of operations before and after welding.
5. Assist in planning plant layout to expedite handling through the resistance welding operations.
6. Design the required welding equipment.
7. Design the accompanying fixtures and any automatic mechanization of the equipment required or desirable.

• Employes Receive Awards

Seven employes of the Wooster Brush Company were added to the rolls of the company's 25-Year Club and received watches emblematic of their election at the annual club party held in Wooster.

There are now 39 living members in the company's 25-Year Club with a total of 1210 years of company service, or an average of more than 31 years per employe.

In the accompanying photograph are the seven new members pictured with President Walter Foss and Cliff Foss, both of whom became 25-Year Club members several years ago. They are, from left to right, Mary Rouhier, Cliff Foss, Lois Snader, Walter Foss, Gertrude Grossman, George Keen, Fay Swinehart, Wade Keister and Rush Boone.

● Lamp Life Ratings

Increased life ratings for three fluorescent and two germicidal lamps have been announced by General Electric Lamp Department at Nela Park headquarters, Cleveland.

The lamps were originally announced with lower life ratings and officials of the company point out the present increases represent an additional dollar value to consumers since the lamp cost now buys more burning hours than when the lamps were first made available.

The 6, 8 and 13-watt fluorescent lamps have new life ratings of 2,500 hours as compared with former 1500 hour ratings. Principal uses of these lamps are in home bedlamps and pin-up lamps and as small inspection lamps in commercial and industrial applications.

The 4 and 8-watt germicidal lamp life rating were also raised to 2,500 hours. Specialists said these new ratings range higher than 50% above original life ratings for these lamps. These small germicidal lamps are in use where ultraviolet radiation is helpful for product protection; to prevent spoilage; to maintain sterilization; to control the rate of fermentation; and to inhibit mold growth.

Lamps bearing the new life rating are currently in stock.

● Rust Honors Employes

Eighteen men and one woman, employes of the Rust Engineering Co. and subsidiary companies, received watches and 100 others, including four women, received pins at a dinner given in recognition of service with the companies.

The dinner, inaugurating the plan of awards to employes after long periods of service, was given at the University Club, Pittsburgh, Pa.

S. M. Rust, board chairman and a founder in 1905 of The Rust Engineering Co. presented the watches to the 19 who have 25 or more years' service. Each also received a Rust triangle pin set with diamonds at the apex.

For 20 years' service 23 employes received Rust triangle pins with a ruby set on a blue background. The 77 who have completed 10 years or more with the companies received a plain gold pin.

S. Murray Rust, Jr., president, was chairman at the dinner and C. G. Thronburgh, vice-president, was toastmaster. W. S. Smith, treasurer, presented the 20-year awards, and J. M. Kelley, vice-president, awarded the 10-year pins.

(Continued on page 304)

MOLDING RUBBER
is work for Specialists
Continental's specialization is based not only upon its 44 years experience, but upon the development of specialized equipment such as the automatic double ram tilting top press shown below. Millions of molded parts made for scores of industries have earned Continental a high reputation. Whenever you have molded rubber parts to plan and purchase, why not have Continental's recommendation?
See our Catalog in Sweet's
CR
Rubber by CONTINENTAL
BRANCHES
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Kansas City, Mo.
Los Angeles, Cal.
Lutz, Fla.
Memphis, Tenn.
Milwaukee, Wis.
New York, N. Y.
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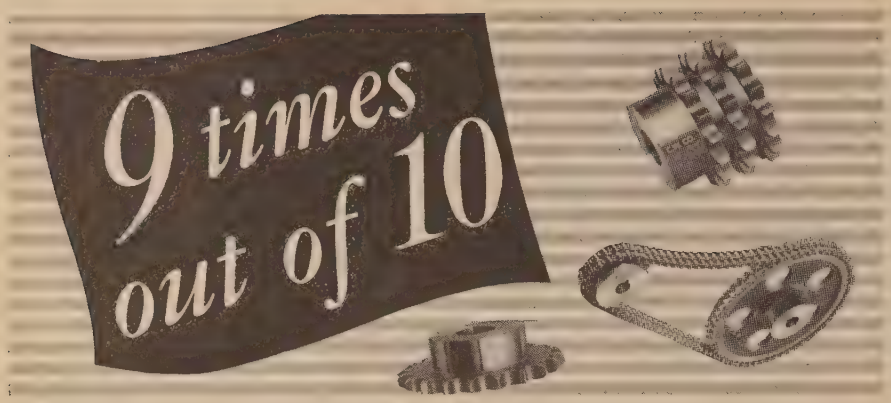
CONTINENTAL RUBBER WORKS • ERIE, PENNA., U.S.A.



CULLMAN *Stock Design* SPROCKETS

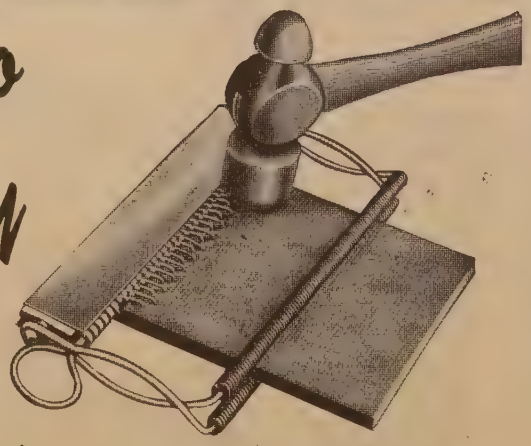
will do the job—Better!

With 2,000 types to select from—you are almost certain to find just the size you need for practically every transmission requirement—*ready for immediate delivery.* Cullman Sprockets — produced by fast, low-cost, high-precision methods—assure top operating efficiency. "Specials," too, *are quickly available*—made up by exclusive Cullman methods and specialized equipment.

Write today for free catalog containing useful data and helpful facts for sprocket users. It lists dimensions.

CULLMAN WHEEL COMPANY
1352-M Altgeld Street Chicago 14, Illinois

Easy to Apply



Safety BELT LACING
REG. U.S. PAT. OFF.

is easy to apply with any standard make belt lacing machine, lacer, or it can be applied with a hammer by using the inexpensive Safety Tu-way Lacer.

Safety's patented binder bars hold every hook in exact alignment, distribute tension uniformly over the full width of the belt assuring efficient performance and long life. They also lap snugly over and protect belt ends and prevent belt fraying.

SAFETY BELT-LACER CO.
5386 N. Menard Ave. Chicago 30, U.S.A.

(Continued from page 303)

● B-36 Capabilities

Consolidated Vultee B-36

The 6-engine Consolidated Vultee B-36 heavy bomber could carry an atomic bomb to any inhabited region in the world and return home without refueling, Army Air Forces headquarters has disclosed.

Now in production at Convair's Fort Worth plant, the B-36 is designed for a normal range of 10,000 miles with 10,000 lbs. of bombs, without extra fuel tanks.

Installation of a new type landing gear which will distribute the huge bomber's weight over a larger area was also announced by the AAF. Eight 56″ wheels will be placed on the main landing gear of B-36 production planes instead of the two massive 110″ wheels on the experimental bomber used in flight tests.

The eight comparatively small wheels, arranged in 4-wheel trucks, will distribute the pusher-type bomber's 278,000 lbs. over a much greater area than the two single wheels. This improved weight distribution, coupled with shortened landing runs resulting from reversible-pitch propellers, will enable the mammoth airplane to utilize a greater number of airfields.

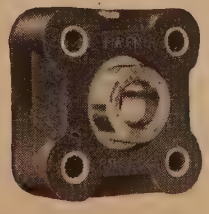
The AAF also released additional

(Continued on page 306)

"Besides being a complete course in employe relations it contains many delightful cocktail recipes!"

Wide inner ring ball bearing with exclusive self-locking collar for slip-fit assembly and disassembly
Single-row radial ball bearing
Prelubricated to last for years and sealed with integral steel shields
Wire spring in base for grounding electrical charges
Inch-dimension bore sizes up to 1 7/16" for popular shaft sizes.
Housing of high-grade, long-life molded synthetic rubber, into which bearing is fitted. For extra rigidity, cadmium plated steel strap is available.
Steel bushing reinforced bolt holes
FAFNIR
APPLICATIONS
Save Money
REDUCE
Noise and Vibration
FOR LIGHT-DUTY

Fafnir Rubber-Mounted Ball Bearing Units



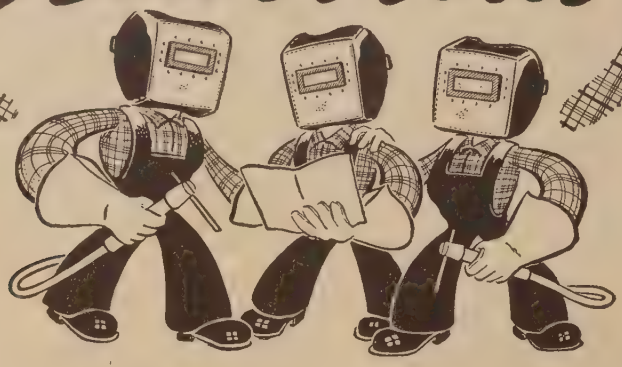
. . . also rubber mounted flange and cylindrical cartridges

HERE'S A BEARING BARGAIN for users of small fans, heating, ventilating and air-conditioning units, small conveyor systems and other light-duty transmission equipment. In one economy-priced package you get low-starting torque to save motors, up to 10% power savings, automatic lubrication, self-maintenance and fast, simple assembly and disassembly . . . all wrapped up in a noise and vibration absorbing synthetic rubber mounting. Available in pillow blocks, flange cartridges and cylindrical units that slip-fit onto standard shafts to replace power-wasting, trouble-making plain bearings. Write for specification folder. The Fafnir Bearing Company, New Britain, Connecticut.

MOST COMPLETE LINE IN AMERICA

FAFNIR BALL BEARINGS

MARQUETTE
Instant arc
A.C. WELDERS
3 Lower Costs



LOW INITIAL COST Marquette "Instant Arc" A.C. Welders are built for heavy-duty 'round the clock production welding. Special transformer design gives you "Instant Arc Striking" and the exclusive A.C. feature of "Balanced Polarity" which completely eliminates all troublesome "Magnetic Blow." Marquette "Instant Arc" A.C. Welders cost less than motor driven machines of comparable output.

LOW MAINTENANCE COST Nothing to wear out because Marquette "Instant Arc' A.C. Welders have no moving parts to wear out . . . no motors, no generators, no brushes, no bearings and no moving cores or coils. Nothing to get out of order, no confusing charts or dials to adjust.

LOW OPERATION COST
Models 262 C and 261 C have Built-In Capacitor for High Power Factor (for lower power company rates) Power costs: Marquette Welders will make a butt weld two feet in length for only 1 cent compared to 3 cents for D.C. machines and 32 cents for oxy-acetylene welding.

Marquette Welders are economical Three Ways . . . Low Initial Cost, Low Maintenance Cost, and Low Operating Cost. Welding is the shortcut to faster production and lower costs. Ideal for all maintenance and repair jobs. Models: 262 and 262C (with Capacitor) 20-275 amps.; 261 and 261C (with Capacitor) 20-200 amps. Eight additional models, 125 to 400 amps.

WRITE FOR LITERATURE

Sold Exclusively thru the Nation's Leading Distributors

MARQUETTE
Welding
EQUIPMENT
A.C. ARC WELDERS · ELECTRODES
GAS WELDING And CUTTING EQUIPMENT
ACETYLENE GENERATORS · ACCESSORIES
MARQUETTE MFG. CO., INC.
MINNEAPOLIS 14, MINN.

(Continued from page 304)

details concerning the B-36, including for the first time a bomb-load comparison with the war-famed B-29. At reduced range, the B-36 can carry 36 tons of bombs, more than three times as many as a B-29 can carry for the same distance.

The giant craft is powered by six Pratt and Whitney 28-cylinder, pusher-type engines developing a total of 18,000 hp., enough to power 200 average passenger cars. These engines turn the largest propellers ever installed on an airplane—19-foot Curtiss electric, hollow steel blades with the first application of thermal anti-icing to production propellers. The B-36 is also provided with wing and tail anti-icing and blister defrosting of the heated-surface type.

Use of two superchargers on each engine, together with pressurized cabins, enables the B-36 to attain a ceiling of 40,000 feet.

The 163-ft. long, 47-ft. high B-36 has a wingspan of 230 ft. and a maximum speed of over 300 mph. The wing tanks hold 21,116 gals. of gasoline and 1,200 gals. of oil, more than the average motorist uses in 20 years.

The 4-section bomb bay has a volume of 12,300 cubic feet, a space equal to that of four railroad freight cars.

The B-36 carries a regular crew of 12, plus a 4-man relief crew. An 85-ft.-long magnesium tunnel connects the pressurized forward and aft crew compartments, transportation being provided by a 4-wheel scooter.

The design and construction of B-36s at the Fort Worth division of Consolidated Vultee is under the supervision of the Air Materiel Command.

• Magnesium Film

"Treasure from the Sea," a new Walt Disney motion picture produced in Technicolor which investigates in 10 minutes the possibilities of magnesium has been sponsored by The Dow Chemical Co. and assigned to the Princeton Film Center.

The film takes its title from the Dow-perfected process of manufacturing magnesium from a formula in which sea water is a component part. It illustrates the effect that use of a metal as light as magnesium will have on both the consumer and industrial fields.

The film may be obtained without charge through the Princeton Film Center, Princeton, N. J. To increase the program time to a half-

(Continued on page 310)

PRODUCTION A fast start

It's only in fable that the tortoise wins! And you, as an experienced businessman, know the advantage of a *fast start* in today's race for tomorrow's markets.

If you are thinking of *expanding* your production, *modernizing* your facilities, *adding* a new process, *relocating* your business or starting a *new* enterprise—look to the War Assets Administration *first* for help in getting that vital headstart.

The War Assets Administration has hundreds of ready-built plants for sale or lease . . . Plants that ran magnificently to win a war, and are in prime condition for peacetime running . . . Plants large and small . . . Plants you may take over fully equipped—or without machinery . . . Plants you may buy or rent as a whole, or occupy in part under a multiple tenancy arrangement.

Right now, when restrictions and material shortages make it so hard for you to build the business home you need, one of these immediately available surplus plants will help you solve that problem.

If you can qualify as a "small business", you will find that a *high priority* is available for your purchase of a plant through the Reconstruction Finance Corporation. Our regional offices will advise you how to obtain this priority certification. Get in touch with the nearest War Assets Administration office listed below.

Write, phone or call for the PLANT-FINDER, a fully indexed, descriptive catalog of Government-owned plants.

WAR ASSETS ADMINISTRATION

OFFICE OF REAL PROPERTY DISPOSAL

Offices located at: ATLANTA • BIRMINGHAM • BOSTON • CHARLOTTE • CHICAGO • CINCINNAT
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NASHVILLE • NEW ORLEANS • NEW YORK • OMAHA • PHILADELPHIA • PORTLAND, ORE.
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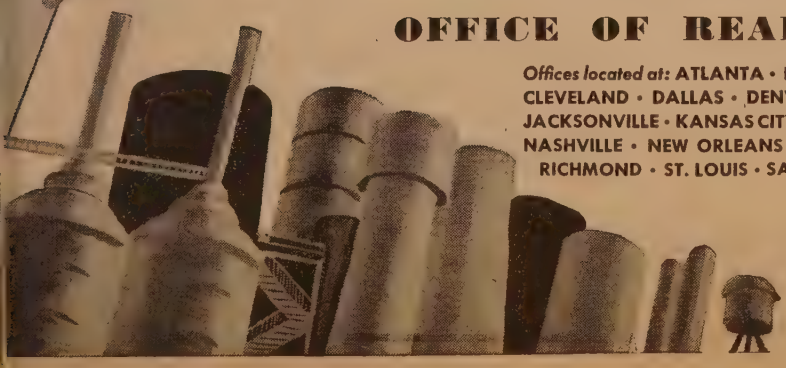


GOVERNMENT OWNED
SURPLUS PLANTS

181-5

STOP RUST

before it starts to eat your profits

PREVENTION is the word for rust. The more of the former the less of the latter. That's why it's just plain common sense to lock the door against rust with Oakite Special Protective Oil before rust deteriorates valuable products. Use this Oakite rust-preventive, for example, to safeguard work after pickling; between machining operations; after welding; on tools in crib; on parts awaiting gauging, testing, shipping; parts in storage—in short use Oakite Protective Oil on any ferrous material that's exposed to damaging indoor rust.

Here's What You Do

Simply dip ferrous parts, (wet or dry) in recommended solution of Oakite Special Protective Oil. Immediately this Oakite rust-preventive displaces all moisture . . . provides a thin, transparent coating that securely locks out rust. Used in recommended hydrocarbon dilutions or at full strength, Oakite Special Protective Oil is both easy to apply and easy to remove. And it doesn't discolor surfaces or interfere with accurate gauging.

Free Booklet Shows You How

16-page booklet gives you step-by-step details and recommended dilutions for the use of Oakite Special Protective Oil. Tells how to neutralize fingerprints. Send for your FREE copy, or ask your local Oakite Technical Service Representative to show you how Oakite rust proofing methods save you money by reducing rejects . . . saving manhours. No obligation, either way. Simply write to Oakite Products, Inc., 25 Thames St., NEW YORK 6, N. Y.

OAKITE

REG. U. S. PAT. OFF.

SPECIALIZED CLEANING MATERIALS • METHODS • SERVICE

Technical Representatives in Principal Cities of U. S. & Canada

(Continued from page 306)

hour for educational, club, church and industrial groups, a 20-minute film on the extraction and processing of magnesium will be offered with the Disney short. Its title is "Magnesium-Metal from the Sea."

Pictured in the Disney short are wheelbarrows, lawnmowers, kitchen utensils and vacuum cleaners made of magnesium to lighten the burden of daily chores. A striking example of its value to industry is offered through an amusing bit of animation that suggests how fast the first train might have gone had it been possible to construct it of magnesium rather than of crudely cast iron.

• Welded High-Pressure Tank

This is a section of a huge high-pressure tank welded for the Stearns Roger Manufacturing Co. at General Iron Works, Denver, Colo. Sections 10 ft. long, 2½" thick, and having an inside diameter of 5 ft. are welded together to make a tank 70 ft. long and weighing 56 tons with General Electric automatic arc welding equipment using ¼" electrode. The nozzle arrangement beneath the tank is a device for preheating both sides of the weld with Skell gas to a maintained temperature of 350°.

• Plexiglas Prevents Ultra-Violet Burns

A new form of Plexiglas known as Special U.V.A. designed specifically to filter out harmful ultra-violet radiations which cause sunburn is announced by the Rohm & Haas Co., Philadelphia, Pa. This special form of the transparent acrylic plastic is ideal for such applications as aircraft enclosures, boat canopies, and sight-seeing bus tops, providing a shatter-resistant material having excellent optical properties. It is also suitable for the fabrica-

(Continued on page 312)

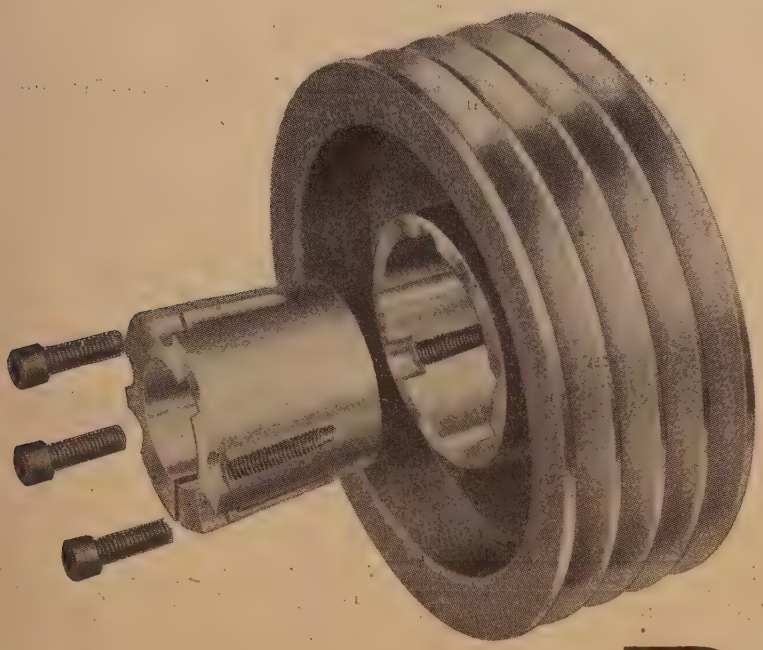
Complete unit.
Slip it on, line it up
and tighten while
sighting.

The simplest,
surest mechanism ever
devised for holding
wheels to shafts.

TAPER-LOCK BRAND

A New Cost-Saving Taper Bore Sheave

Holds fast to
the shaft with firmness
equivalent to a
shrunk-on fit.



Disengages
with less effort than
any other sheave.
Easy on. Easy off.

Complete
range of sizes —
in Dual Duty,
B, C and D grooves.

DODGE

of Mishawaka, Ind.

For details about cost-saving developments in power transmission equipment, call the Transmissioneer—your local Dodge distributor. He's factory-trained, qualified to suggest ways to improve machine performance and increase production. Look for his name under "Power Transmission Equipment" in your classified telephone directory.

DODGE MANUFACTURING CORP., MISHAWAKA, INDIANA

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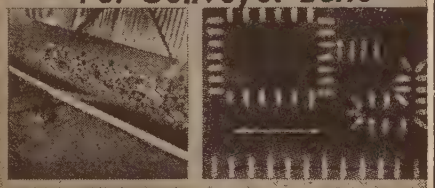
NAME PLATES

FOR YOUR NAME PLATE REQUIREMENTS, WRITE OUR SUBSIDIARY,
ETCHING COMPANY OF AMERICA, 1520 MONTANA STREET, CHICAGO 14, ILLINOIS

Present Day Practice in Belt Fastening

Every man who has anything to do with the purchase, application or maintenance of conveyor, transmission or V-belts will find the bulletins listed below of considerable value in connection with belt fastening work. A knowledge of present day practice in belt fastening helps reduce the loss in machine hours due to belt failures caused by the use of the wrong type of fastener or improper application. We shall be glad to send any or all of them to you or to any of the men in your organization.

For Conveyor Belts



FLEXCO HD Belt Fasteners are used to make a "water-tight" butt joint in conveyor belts ranging from ¼" to 1½" thick and of any width. The view on the right shows the various types of rips and patches that can be made with these fasteners and Flexco HD Rip Plates.

Bulletin F-100 gives complete details on how to fasten and repair conveyor belts.

For V-Belts

ALLIGATOR V-Belt Fasteners are now being widely used to fasten B, C and D, open-end V-belting of cross woven fabric core construction now being made by most belting manufacturers. The view at the left shows a typical application of these fasteners to a drive where endless V-belts would require dismantling the machinery to put the belts on the sheaves.

Bulletin V-205 gives complete instructions on how to use V-belt fasteners.

FLEX V Fasteners for A and B belts are also available for lighter duty V-belt drives. Ask for **Bulletin V-14.**

For Transmission Belts

ALLIGATOR Steel Belt Lacing is in world-wide use to make smooth, flexible joints in leather, rubber, balata, stitched canvas or solid woven belts up to ⅜" thick and as wide as they come.

Bulletin A-60 tells how to fasten and repair transmission belts.

Sold by Supply Houses Everywhere

FLEXIBLE STEEL LACING COMPANY
4611 Lexington Street, Chicago 44, Ill.

(Continued from page 310)

tion of protective sun glasses, welding goggles and numerous other devices where the transmission of ultra-violet radiation is undesirable.

An unusual feature of the new material is that its ultra-violet absorbing characteristic actually improves with aging. Transmission in the visible range and the familiar transparency of Plexiglas are not affected.

The new Plexiglas Special U.V.A. can be worked readily with ordinary wood or metal working tools or formed by softening with heat. A temperature slightly above that of boiling water is recommended.

Since this plastic permits full vision without danger of sunburn it is ideal for aircraft enclosures. There is no reduction in the fine optical properties long recognized as characteristic of Plexiglas. In marine applications the new Plexiglas will withstand continous exposure to salt spray without loss of its lustrous transparency or change in its ultra-violet absorbing property. Danger of conjunctivitis, the eye inflammation caused by over exposure to ultra-violet rays, is lessened through the use of this special plastic.

● Tube Testing Chamber

A new tube testing chamber, capable of simulating operation of 80,000 ft. altitude under a wide range of temperature and humidity conditions, has been announced by the Tube Division of the General Electric Company's Electronics Department.

Called a "Tube icebox," this high-altitude chamber was custom built to aid in the design, test and development of electronic tubes for many applications at varied temperatures ranging from 100° below to 175° (Farenheit) above zero.

Originally designed to test tubes for wartime aircraft equipment, it is now equipped to handle multi-purpose testing of all tube types, G.E. engineers said.

Two dials outside the door automatically control, operate and re-

(Continued on page 314)

Free literature—

Post card between

pages 170 & 171

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Established 1876

FABRICATORS of STRUCTURAL STEEL

Buildings, Bridges and All Types of Steel Structures

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WELDED STEEL
BENCH OILERS

Eagle originated the welded steel bench oiler forty years ago!

- body of one-piece seamless steel
- reinforced insert type spouts with welded seam
- machine cut threads
- bottoms electrically welded to bodies
- made with straight, bent or flexible spouts
- sizes—⅓, ½, ¾, and 1 pint capacities

Order from your Distributor

Eagle Manufacturing Co.
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A WORLD STANDARD FOR PRECISION

No matter what your Work Holding Problem . . . consult CUSHMAN

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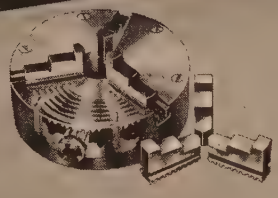
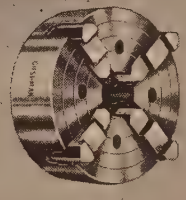
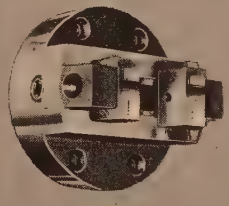


3 JAW SELF-CENTERING

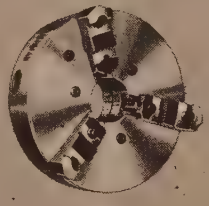


4 JAW INDEPENDENT

Medium Duty



2 JAW SELF-CENTERING



3 JAW SELF-CENTERING

4 JAW INDEPENDENT

Heavy Duty

2 JAW SELF-CENTERING

3 JAW SELF-CENTERING

4 JAW INDEPENDENT

Extra Heavy Duty

3 JAW SELF-CENTERING

4 JAW INDEPENDENT

Cushman Chucks are now being made in a wider range of types, sizes and jaw specifications for mounting on American Standard Type A-1, Cam-lock Type D-1 and Long Taper Key Drive Spindle noses, as well as for use on threaded spindles, using adapter plates. We are ready to serve you to meet post war requirements on expanded production lines. The right chuck with the right jaw equipment can help you reduce machining costs. Consult us.

THE CUSHMAN CHUCK COMPANY
HARTFORD 2, CONN.

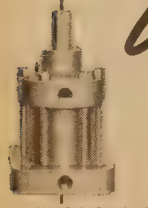
Consult
CUSHMAN

Chucking Engineers Since 1862

SPECIFY

T-J

for Tough Jobs!



T-J HYDRAULIC CYLINDERS

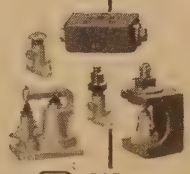
T-J AIR CYLINDERS

T-J CLINCHORS

T-J Performance is helping plants throughout industry handle tough jobs at *top-speed* and *efficiency* . . . with *lower costs!*

Right now in your plant—there may be many jobs that T-J Products can perform faster and better. Check your needs for air cylinders . . . hydraulic cylinders . . . Rivitors . . . cutters . . . Clinchors . . . or air controls — these are products that T-J builds with ahead-of-the-times features! Backed by more than a quarter of a century's experience . . . T-J engineered and precision-built for utmost *accuracy* and *dependability.* Write for bulletins. The Tomkins-Johnson Co., Jackson, Mich.

T-J CUTTERS



T-J AIR CONTROLS

T-J RIVITORS

TOMKINS-JOHNSON

RIVITORS...AIR AND HYDRAULIC CYLINDERS...CUTTERS...CLINCHORS

T-J

(Continued from page 312)

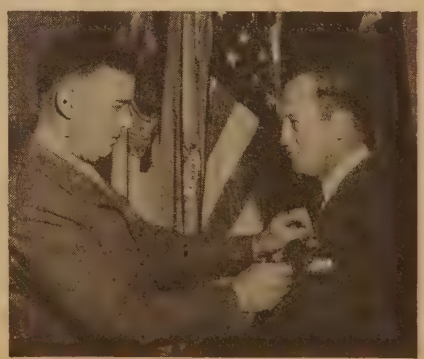
cord, on a 24-hour chart, conditions within the chamber, which is spacious enough to test most tubes together with their associated equipment. Six panes of glass in the door of the unit, the last about an inch thick, assure maximum stability of altitude humidity and temperature ranges, the engineers said.

Leads into and out of the chamber furnish the engineers with detailed information on tube operation under varied conditions. There are 20 standard leads, 12 pair of thermocouple leads and three high-frequency coaxial leads connected to a terminal board on one side of the chamber where measurements can be made, it was explained. Four pipes through the walls of the "tube icebox" also make provision for the testing of forced-air and water-cooled tube types.

Engineers said that elaborate refrigeration and pumping equipment located back of the chamber made possible arrival of the desired altitude and climatic conditions in a comparatively short period of time. Altitude is attained at the rate of 3,000 feet a minute while 100° below zero can be reached in about two hours. As high a temperature as 175° above zero can be simulated in approximately 45 minutes.

The internal working area of the chamber is three feet wide, three feet high and five feet deep. The overall equipment occupies a space of approximately seven feet by eight feet by 15 feet.

● C. S. Strike Honored



Major General James A. Van Fleet, left, and Clifford S. Strike.

Clifford S. Strike, president of F. H. McGraw & Co., Hartford, Conn., and New York City, was recently awarded the Medal of Freedom, one of the highest awards the Government can give to a civilian. The citation stated the award was for exceptionally meritorious achievement which aided the United

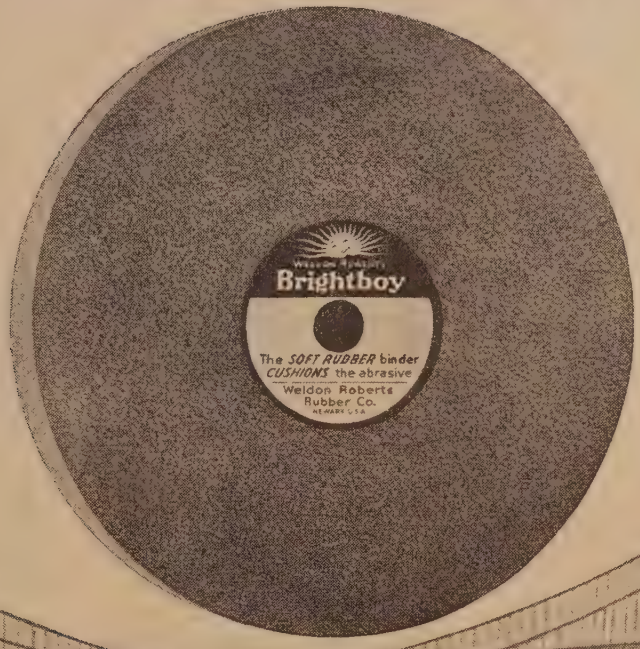
(Continued on page 316)

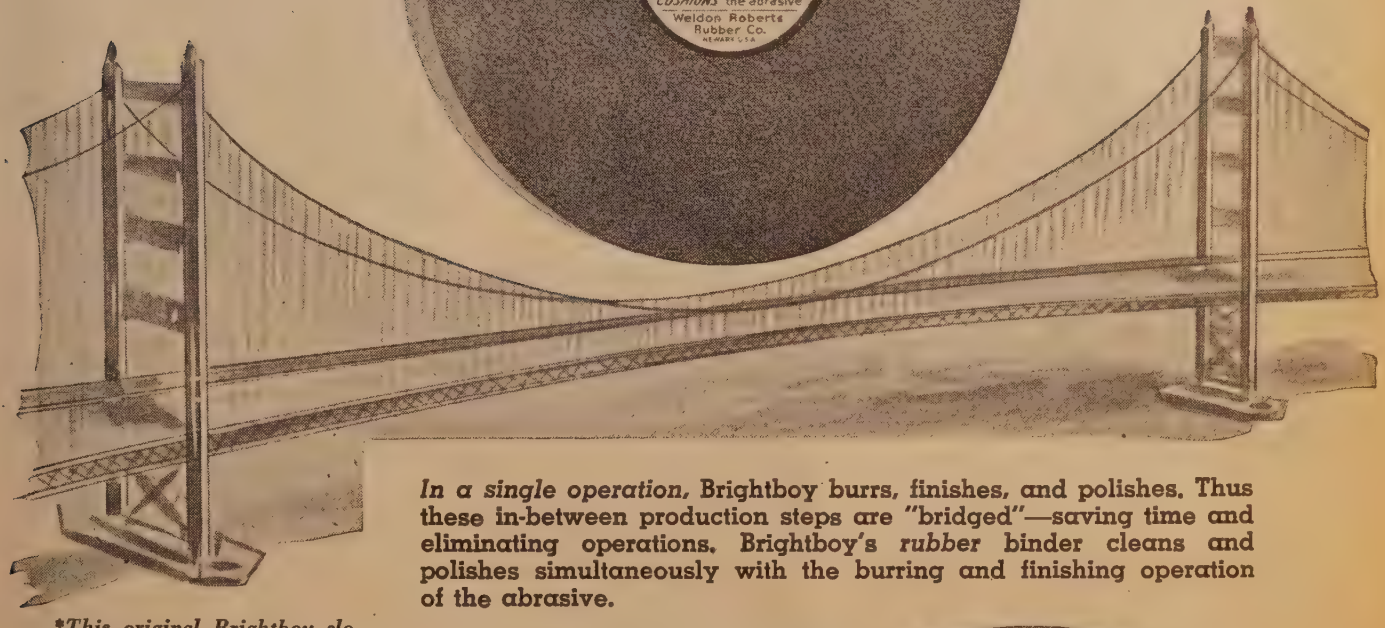
Brightboy

REG. U. S. PAT. OFF.

*BRIDGES THE GAP BETWEEN GRIND AND BUFF

3 TEXTURES
BRIGHTBOY STANDARD
BRIGHTBOY FINE-TEX
BRIGHTBOY TUFF-TEX





In a single operation, Brightboy burrs, finishes, and polishes. Thus these in-between production steps are "bridged"—saving time and eliminating operations. Brightboy's *rubber* binder cleans and polishes simultaneously with the burring and finishing operation of the abrasive.

**This original Brightboy slogan, first used some years ago, heralded the introduction of a new and unprecedented type of abrasive finishing. Brightboy rubber-cushioned abrasives have since become the "buy word" for leading American firms in metal-finishing industries.*

Your dealer will give you Brightboy methods-and-applications literature, the Brightboy catalog-manual, and prices. Brightboy service engineers will gladly call to recommend specific production procedure.

BRIGHTBOY INDUSTRIAL DIVISION
Weldon Roberts Rubber Company **Newark 7, N. J.**
Pioneers in the development of soft rubber cushioned abrasives.

WELDON ROBERTS
Brightboy

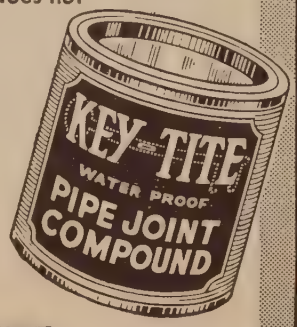
the SOFT RUBBER BINDER
CUSHIONS *the Abrasive*

STOP COSTLY LEAKS!

SEAL PIPE JOINTS
with KEY-TITE

Pipe joints once sealed with Key-Tite do not leak, yet they can be easily opened because Key-Tite does not freeze the connection. It contains no lead nor lead substitutes and does not affect the taste or odor of potable liquids. Key-Tite prevents leaks on all lines carrying water, gas, low-pressure steam, compressed air, etc.

Send for Free Sample — test Key-Tite in your own plant at no cost to you.



KEY Company

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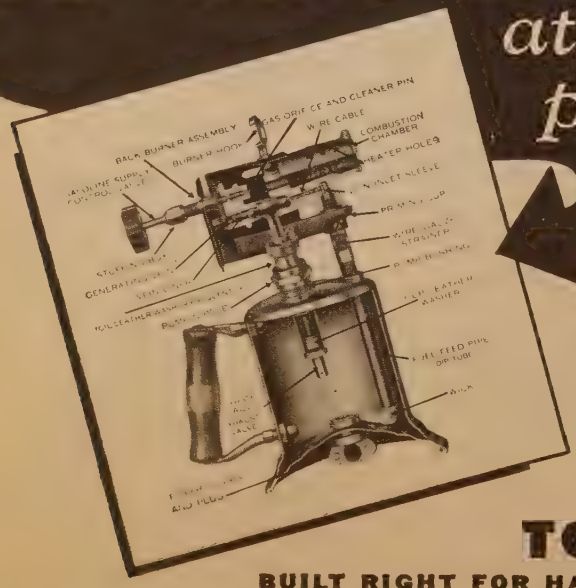
EXTRA QUALITY
at every point!



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BLOW
TORCHES
BUILT RIGHT FOR HALF A CENTURY

That's why... C & L Blow Torches give better performance over a period of years. Proven experience — plus more than half a century of satisfactory service has earned top position for C & L Blow Torches and Fire Pots.

At leading jobbers everywhere.

CLAYTON & LAMBERT MFG. CO.
1712 DIXIE HIGHWAY • LOUISVILLE 10, KY.

(Continued from page 314)

States in prosecution of the war against the enemy in Continental Europe, as United States Representative, Economics Division, Quadripartite Valuation Committee, from Nov. 3, 1945, to Dec. 6, 1945. Mr. Strike spent eight months in Europe as chief of the building materials, construction and forestry office of the U. S. Military Government for Germany. Among other duties he was responsible for providing temporary housing for some 4 million homeless Germans.

Major General James A. Van Fleet, Deputy Commander First Army, made the award.

• 32 Years of Motors

The 140,000th Type T Motor built by the Reliance Electric & Engineering Co., Cleveland, Ohio, this 300 hp. "offspring" of a long line lacked only its final coat of paint when inspected recently by company officials. President J. W. Corey, left, and A. M. MacCutcheon, who recently retired as senior vice president, worked together on the original development of the motor back in 1914.

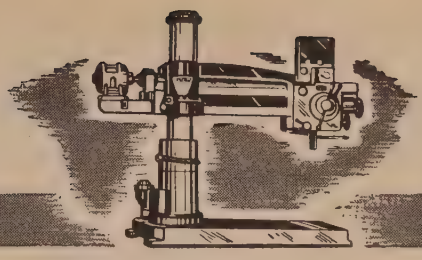
In the 32 years since then, Reliance has produced millions of horsepower in these heavy-duty, d-c motors for the steel and other major industries. Shown with Mr. Corey are, left to right, John England, veteran assembler; F. E. Harrell, general works manager, and W. R. Hough, chief engineer.

• Flowrator Is New Name

Fischer and Porter Co., manufacturer of variable area type flow metering instruments heretofore called "Rotameters," has recently announced adoption of the trademark name "Flowrator" to designate the product of its manufacture.

The first use of the former name "Rotameter," according to the company, appears to have been made about 40 years ago by one of the early European manufacturers of

(Continued on page 318)



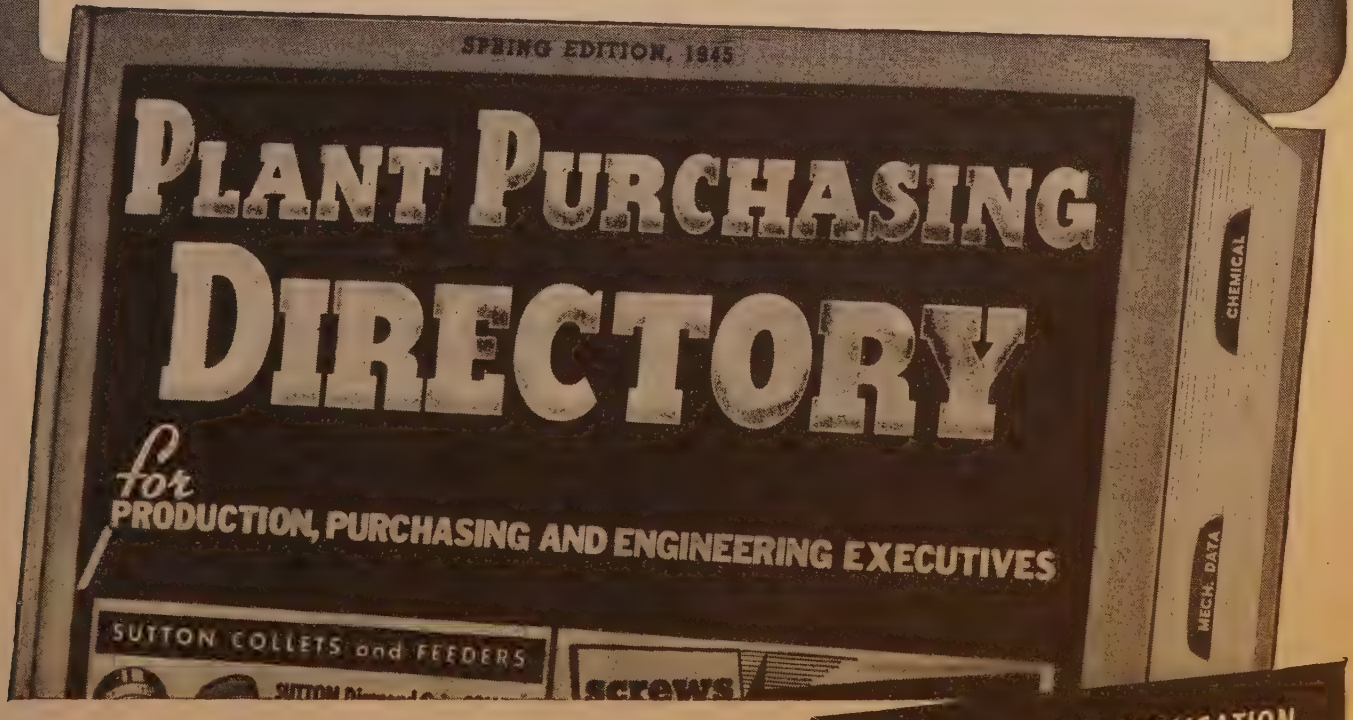
PLANT PURCHASING DIRECTORY

Made to Fit the needs of

Production, Purchasing and Engineering Executives

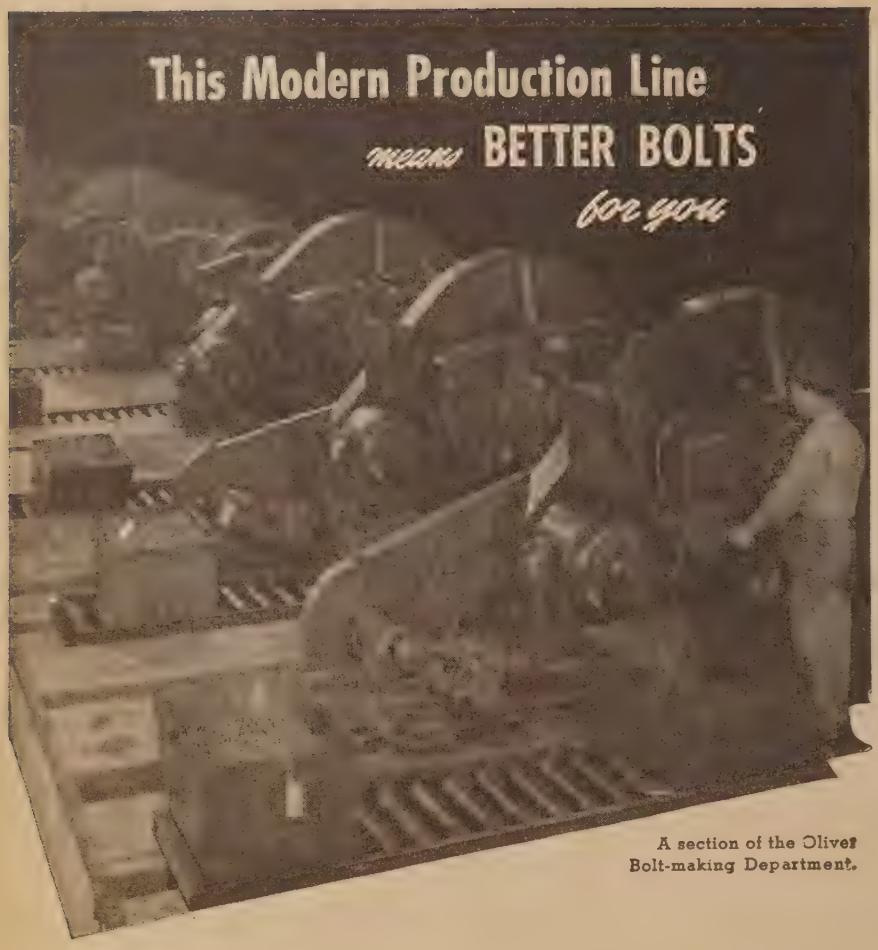
This radial drill press is designed and built for work that would be difficult or impossible to do on a conventional drill press. Doing it otherwise would take longer, cost more.

There are many possible sources for purchasing information, but if you are an industrial buyer, the one that will best serve your needs, because it is specifically designed for your use, is PLANT PURCHASING DIRECTORY—small enough for your desk, big enough to give you full information. Keep it handy for ready-reference!



PLANT PURCHASING DIRECTORY
333 North Michigan Avenue, Chicago 1, Illinois

A CONOVER-MAST PUBLICATION
(Formerly Plant-Production Directory)

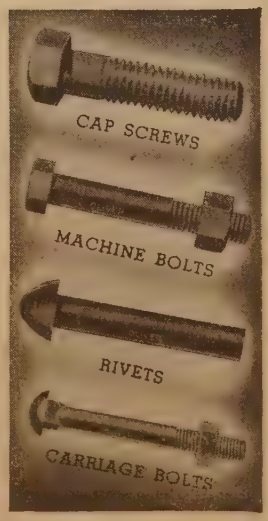


A section of the Oliver Bolt-making Department.

Dependable, Uniform
OLIVER Fasteners

Dependable uniformity and high quality are features of OLIVER Industrial Fasteners that make these products your best specification. Made by modern production methods and carefully inspected before shipment, Oliver bolts, nuts, screws, rivets and special fasteners fit accurately, thread-on readily and hold firmly.

See Your
Industrial Distributor



OLIVER
IRON AND STEEL
Corporation
SOUTH TENTH AND MURIEL STS. PITTSBURGH 3, PA.

(Continued from page 316)

variable area type flow rate indicators using transparent tapered tubes. This manufacturer utilized plumb-bob shape metering floats having bias notches cut into the float heads to impart a rotating motion. The rotation improved the stability of the metering floats and eliminated most of the vertical and horizontal oscillation previously encountered. In view of this rotation, the name "Rotameter" was used even though it did not describe any essential function or operating requirement of the instrument and led to the erroneous impression on the part of many who first heard it, that the instrument measured rotation. As specialists in the manufacture of the variable area flow meters for indicating, recording, controlling and integrating flow rate, Fischer and Porter Co. have developed the new "bead-guide" metering tube and other methods of float stabilization more positive than the rotation feature. The rotating float has therefore been abandoned and the old name "Rotameter" has lost all significance as applied to the company's product.

Therefore, the company has coined the new trade-mark name "Flowrator" for its product.

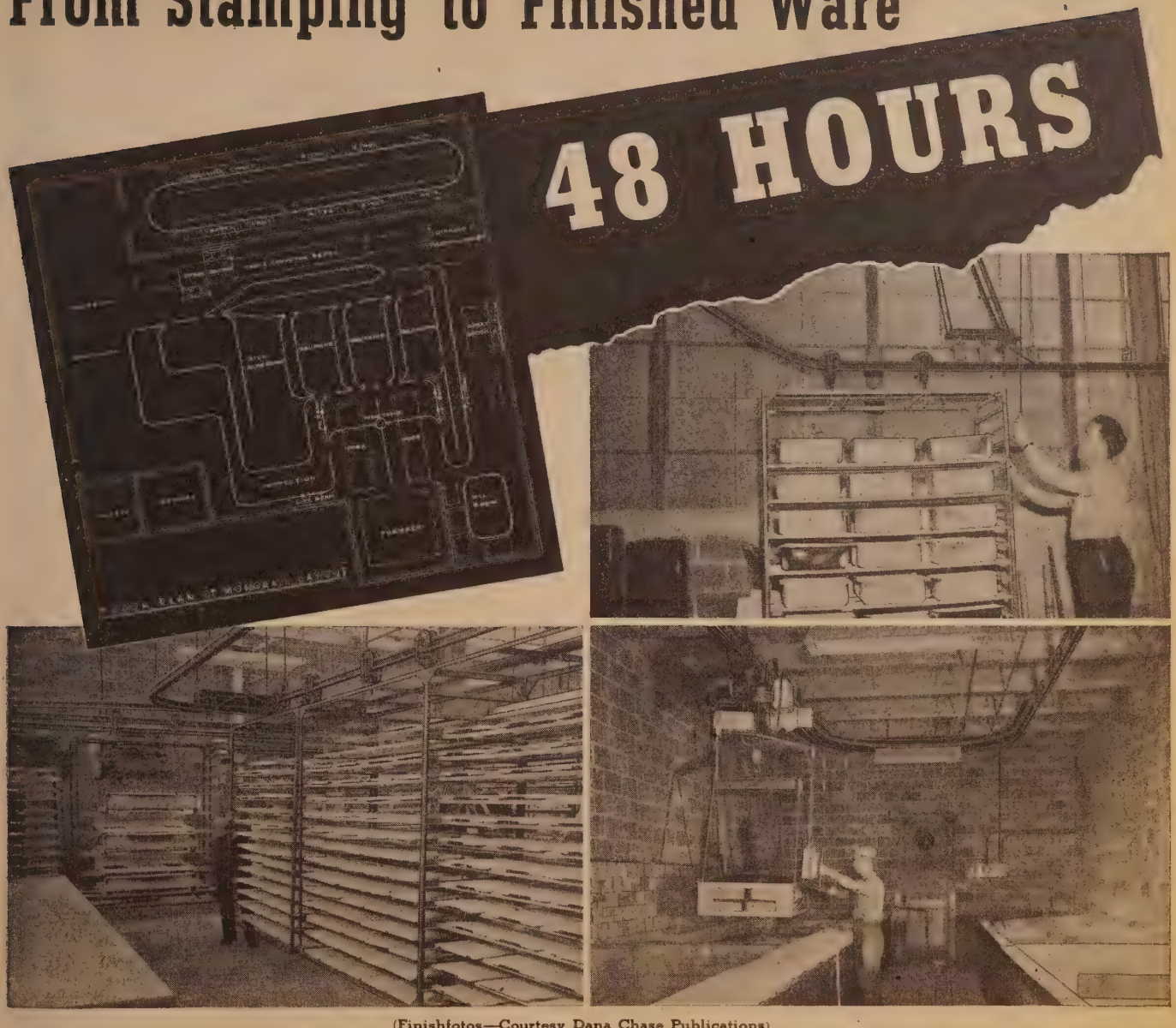
• Magnetic Paper Tape

A magnetic paper tape known as Hyflux and produced by The Indiana Steel Products Co. makes possible recordings of radio programs by combining it with a radio. Unwanted portions of the recorded program can be easily edited out by a demagnetizing process or eraser provided on the recorder unit, or by simply snipping out the unwanted sections and splicing the tape with Scotch tape.

Illustrated is a completed self-contained portable model tape recorder with carrying case. It includes both recording and play-back facilities. Total weight of the unit is approximately 40 lbs. The recorder is the combined work of the Indiana Steel Products Co. and the physics research division of the

(Continued on page 320)

From Stamping to Finished Ware



(Finishfotos—Courtesy Dana Chase Publications)

Compactness and a steady flow of material were considered essential in this porcelain enamel ware and parts plant. The American MonoRail system over which all ware is handled, is compact, avoids bottlenecks and assures 48 hours turnover from raw stamping to finished ware.

American MonoRail equipment serves each operation. Flexible arrangement permits continuous and prompt flow of ware through all departments. An unusual feature is shown in top photo where a simple air device lifts racks from one level to another, permitting easier loading and unloading. In this plant, like hundreds of others, American MonoRail equipment tends to integrate entire operations.

An American MonoRail Engineer may be able to show you how to speed up your operations with no sacrifice to quality and with marked savings. We invite your inquiry.

SEND FOR BULLETIN C-1
A 56-page book showing successful applications of American MonoRail Systems.

THE AMERICAN MONORAIL COMPANY

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Hot Marks
... that remain clear and identifying when cold!
FOR MARKING METALS TO 800°
METAL MARK
HOTMARX
FOR MARKING METALS 800° TO 2000°
THE PERFECT PAIR FOR ALL METAL MARKING

Especially made for marking metals in foundries, mills and factories. This ideal pair, HOTMARX and METAL MARK Markers, meet the most rigid requirements.

METAL MARK

Produces clear, legible and lasting marks on all metals up to 800°.

HOTMARX

Marks clearly and easily on metals so hot that ordinary markers would flame up and burn. Marks perfectly on metals up to 2000° and will not smoke or run.

Send for your free copy of the Industrial Crayon Guide, or tell us about your marking problems.

Dept. MF-32

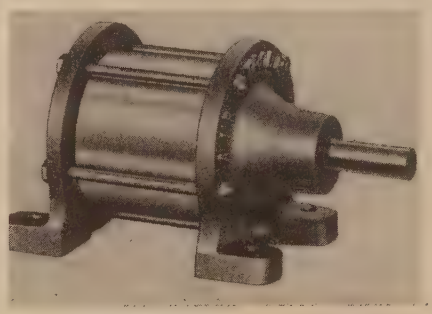
THE AMERICAN CRAYON COMPANY
1706 HAYES AVENUE SANDUSKY, OHIO
NEW YORK SAN FRANCISCO DALLAS

(Continued from page 318)

Midwest Research Institute of Kansas City, Mo.

Hyflux is a metallic base powder as contrasted with other tape materials which are oxides. Its magnetic properties are apparently due to the unique process of its preparation as much as to its composition. Its immediate and most practical use is that of magnetic sound recording tape.

● Air Control Cylinder



Air-Trol, Chicago, has announced a new line of air cylinders designed to expedite material holding operations for drilling, reaming, tapping, milling, grinding, injection and ejection, and thousands of other operations where air power is faster, cheaper, and less fatiguing than the use of clamps or other mechanical holding devices—or where it simplifies, speeds up or lowers the cost of jig design.

Air-Trol features are (1) truebore cylinders; (2) non-rusting cylinder heads; (3) oilless (graphite impregnated) bronze ram bushings; (4) precision assembly for smooth, trouble-free operation.

Sizes range from 1½" up; power factor from 1.76 times air line pressure. Design is for single or multiple (production line) setup. Foot control (to leave operator's hands free) is available as supplementary equipment.

OBITUARIES

▲ Charles Burton Thwing, pioneer in the field of pyrometry and president of the Thwing-Albert Instrument Co. in Philadelphia, died Dec. 12 at the age of 87 years. Included in Dr. Thwing's research was early work in the development of the electric light and wireless. He also formulated Thwing's Law on capacity.

▲ William R. King died at his home in Pittsburgh on Dec. 30 after a brief illness. Mr. King was sales manager of Wm. K. Stamets Co., Pittsburgh.

KEEP PRODUCTION ROLLING ON BEARINGS FROM L & S

Two-Fold Source of Supply—L & S manufactures radial, thrust, roller bearings, and pillow blocks.—L & S is distributor for other manufacturers.

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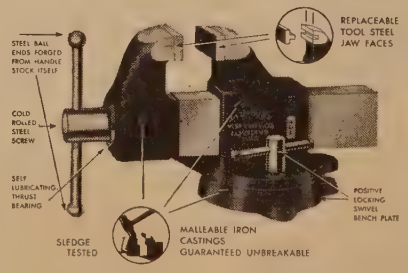
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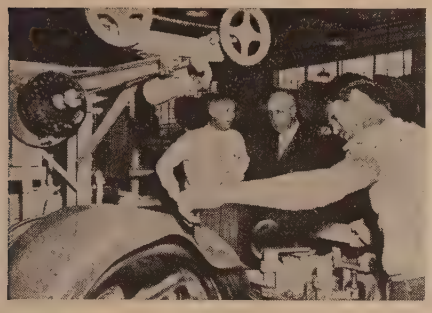
NEW PLANTS AND EXPANSIONS

● Goodyear Cuban Factory



Marvin A. Ryan, left, production manager, and P. W. Litchfield, chairman of the board for Goodyear, watch a Cuban tire builder at work.

Production is underway at Goodyear Tire & Rubber Company's new factory near Havana, Cuba, according to George K. Hinshaw, vice president and production manager of the company's foreign operations. Built in the middle of a 14-acre orange grove, the new plant is producing popular size tires and tubes, repair materials, and rubber heels for the Cuban market.

Goodyear personnel at the plant is headed by Richard P. Morgan, vice president and general manager; Marvin A. Ryan, vice president in charge of production, and Eugene Riveroll, treasurer.

● Building in Jersey

Economics Laboratory, Inc., St. Paul, Minn., manufacturer of soapless cleaners, is building a 40,000 sq. ft. plant at Lyndhurst, N. J. Walter Kidde Constructors, Inc., New York City, are constructing the plant which will be completed by next September. It is a one story plant and covers an acre of ground.

● Bliss & Laughlin Office

Bliss & Laughlin, Inc., announce the opening of a district sales office, Room 1303, State Tower Bldg., Syracuse, N. Y. James D. MacPherson has been appointed manager. Mr. MacPherson joined the company in 1929 and served in both the manufacturing and sales departments.

● Westinghouse Buys Site

Purchase of 27 acres in Little Rock, Ark., for construction of an incandescent lamp manufacturing plant has been announced by Ralph C. Stuart, vice president of the Westinghouse Electric Corp. in charge of the company's lamp and lighting divisions.

(Continued on page 322)

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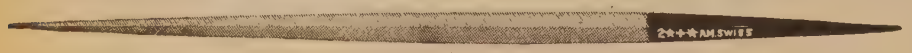

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SWISS PATTERN FILES

(Continued from page 321)

Excavation is expected to get underway in the near future and initial production of lamps is tentatively scheduled for December, 1947. Automatic machinery for the new plant already is being built at the Lamp Division's headquarters plant in Bloomfield, N. J.

It is estimated that 800 persons eventually will work in the 150,000 square feet of floor space planned for the building. L-shape, it will have an administration wing facing Roosevelt Road with the rest of the structure devoted to manufacturing, storage of raw materials and finished lamps, shipping and receiving.

Except for a few key executives, personnel for the plant will be recruited from Little Rock and surrounding communities.

● Thermoid Western Plant

Thermoid Co., Trenton, N. J., is constructing a new manufacturing plant at Nephi, Utah, which will be known as Thermoid Western Co. and which will supply the west coast and northwestern business of Thermoid. It is hoped to have the plant begin operations next summer. It is planned to build up the total number of employes to 500 or 600, and to add to their comfort, the plant will be equipped with a modern cafeteria and modern dressing and wash rooms. There will be parking facilities for cars, and a complete service station for overhauling cars and trucks will be opposite the plant.

● Buys Los Angeles Plant

Russell, Burdsall and Ward Bolt and Nut Co., Port Chester, N. Y., has announced acquisition of the plant and other assets of the Cooper Screw Manufacturing Co., of Los Angeles. Charles D. Brenner, formerly in charge of the Los Angeles office of RB&W, is manager of sales for the new plant. R. A. MacDonald from the RB&W Port Chester plant is serving as plant manager at Los Angeles. With the acquisition of the Cooper plant, RB&W now has factories at Port Chester, N. Y., Coraopolis, Pa., Rock Falls, Ill., and Los Angeles.

● Company Moves

O'Neil-Irwin Manufacturing Co. has moved its general offices and all manufacturing facilities from Minneapolis to Lake City, Minn. The new building is located on the main line of the Milwaukee Rail-

road, 70 miles from Minneapolis, and has increased floor space to allow expansion of its line of precision benders, brakers and shears and to develop new types of Dieless duplicating equipment.

● Overly Again Enlarges

Herbert W. Wehe, president of Overly Manufacturing Co., Greensburg, Pa., has announced purchase of McAleenan Brothers Co., located at 25th Street and Allegheny Valley R.R., Pittsburgh. George R. McAleenan will continue as president of the company, according to Mr. Wehe, and all personnel is being retained.

The McAleenan plant, established by George McAleenan in 1911, produces boilers, tanks, stacks and heavy plate work for industrial plants, railroad, general contracting and other similar markets. Its acquisition is expected to provide a valuable addition to Overly's facilities and products in the sheet and plate metal-working field, and continues the expansion program which Overly initiated in May, 1945, when the Greensburg Co. acquired the Kiromac Manufacturing Co., of Richmond, Indiana.

● Ditto Has New Plant

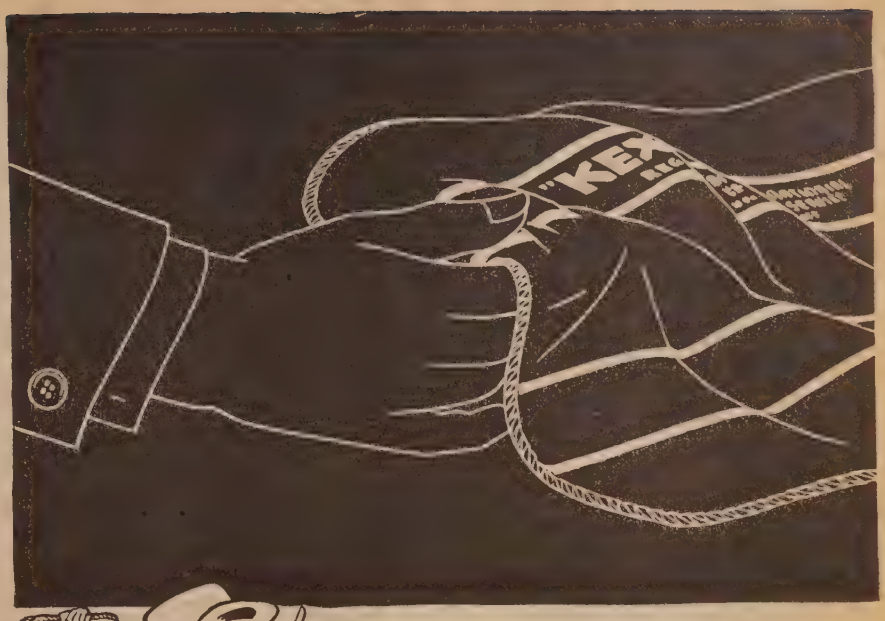
Ditto, Inc., Chicago-New York business systems manufacturers, have purchased a new manufacturing plant at 4600 West Parker Ave. It will be known as Plant No. 5. The building program of the new plant in Lincolnwood, Ill., will go forward as soon as conditions are favorable.

● G. E. Turbine Factory

A huge $20,000,000 factory for the manufacture of steam turbines and electric generators will be built at the General Electric Company's Schenectady Works, it was announced by Charles E. Wilson, G.E. president, following approval of the project by the company's board of directors.

Decision to construct the new building was made after long-term forecasts indicated an increasing demand for large steam turbines and generators, according to Roy C. Muir, G. E. vice president and general manager of the Apparatus Department. Referring to the company's position as the world's largest turbine-generator manufacturer, Mr. Muir stated, "the very best manufacturing facilities are re-

(Continued on page 324)



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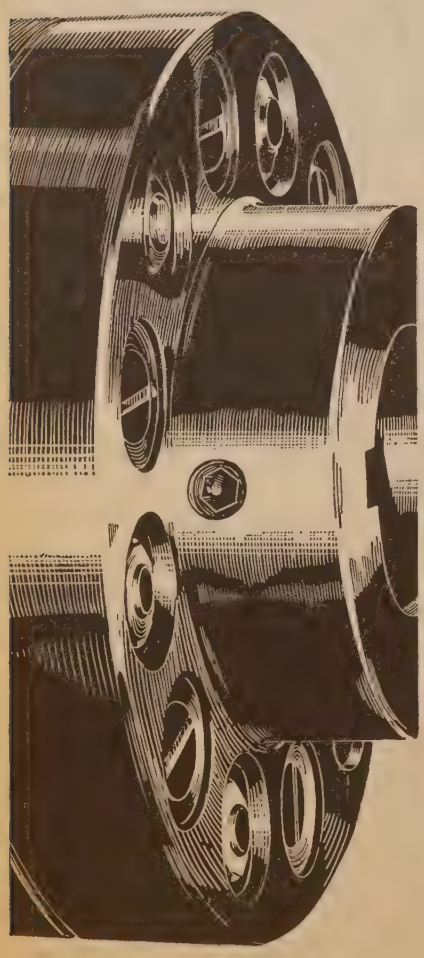

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AJAX FLEXIBLE COUPLING CO. INC.
WESTFIELD, NEW YORK

(Continued from page 323)

quired if we are to keep abreast of the forecast."

Declaring that the factory will be constructed at Schenectady "in recognition of the great technical knowledge and skill which our engineers and turbine-shop workers have accumulated here through the years," the G.E. official said, "they deserve the best possible plant and machines to help maintain their leadership."

J. M. Howell, Schenectady Works manager, said that all steam-turbine facilities of the Turbine Division, now located in several buildings, will be situated in the new plant. It will cover about two and one-half times the ground area occupied by the present turbine shop, which is the largest manufacturing building in the Schenectady Works.

"The turbines manufactured will range from 10,000-kilowatt to 200,000-kilowatt capacity," Mr. Howell said. "The assembled weight of one of these larger units will be about 760,000 pounds, and its generating capacity could furnish light and power to a city of 600,000 population."

To Cover About 19 Acres

With a frontage of 650 feet, the building will be 1290 feet, or nearly a quarter-mile long, and will cover approximately 19 acres. To support the tremendous weight of the building and its heavy equipment and products in process of manufacture, very heavy foundations and extensive pilings will be required. There will be approximately 57,000 of these piles, some reaching down 140 feet to the bed rock of the Mohawk Valley.

Unusually heavy structural steel will be necessary for the superstructure. Indicative of the size of the products that can be handled in the new structure, compared with the original Works turbine building, is the fact that it has 200-ton cranes while the largest crane now used in turbine manufacturing is rated at 100 tons.

Much new equipment will be installed in addition to that moved from buildings at present used to house turbine manufacturing activities. The shop will have a wide variety of machine tools from the smallest bench grinder to a 40-foot boring mill capable of machining castings weighing approximately 200 tons.

Lighting will be of the most modern type using a combination of fluorescent, mercury and incandescent fixtures. Forced ventilation moving approximately 150,000,000 cubic feet of air per hour will be used throughout the building. It will require approximately 40 tons of coal per day to heat this structure in cold weather.

There will be 12 test stations, each equipped to test any of the turbine units manufactured in this building. A pumping station with intake crib will be built at the Mohawk River to supply 30,000 gallons of water a minute for condensing exhaust steam from the turbines in process of being tested. Steam will be supplied at 400-lbs. pressure for driving turbines.

As facilities in the new structure become progressively available, employes will transfer from the present turbine buildings. When the installation is completed, approximately 3,000 will be employed in the shop and offices, though the number may vary with changing business conditions.

● North Star Acquisition

Already doing business five times its pre-war volume, the North Star Woolen Mill Co. has acquired another plant to add 40% to its production of blankets and fabrics.

W. G. Northup, president of the company, announced that North Star has purchased the Wakefield Woolen Co., of Wakefield, R. I. It will be known as the Wakefield, R. I., division of the North Star Woolen Mill Co.

The newly acquired mill will produce the same all-wool products as are manufactured in the present plants of North Star in Minneapolis and Lima, Ohio. The Lima mill was acquired in 1941.

The two mills now in operation employ 700 persons, and the Wakefield mill will add about 100. Herbert C. Whitehouse, plant manager of the Minneapolis mill, will be general manager at Wakefield. Its facilities will be extended to 40 automatic looms, and new dyeing and finishing equipment will be added.

● Borg-Warner Is Buyer

Borg-Warner Corp. has announced the purchase of the physical assets of the Superior Sheet Steel Co., of Canton, O., to provide an additional source of sheet steel to increase production in the current housing emergency. The Superior mill will continue under its present management personnel as a division of Borg-Warner.

Commenting on the purchase, C. S. Davis, Borg-Warner president,

said: "Under the unprecedented requirements of the National housing program we found it necessary to provide an additional source for steel sheets to be used in the manufacture of the Ingersoll utility unit for homes, and of the Norge house furnaces, space heaters, kitchen ranges, and other household appliances.

"The acquisition of the Superior mill is expected to increase our supply of steel sheets. However, we have no intention of extending into the sheet steel industry and shall continue to rely upon the large established mills for 85% or more of our current expanded requirements."

The Superior plant employs approximately 600 men and has efficiently equipped mechanized mills producing black sheets and cold finished sheets. It also rolls terne plate, electrical silicon sheets, galvanized and galvannealed sheets.

• Paisley Expansion

Joseph Morningstar, president of Morningstar, Nicol, Inc., has announced plans for improvement of the two buildings recently purchased by his firm in New York City. The property is occupied by a subsidiary, Paisley Products, Inc., manufacturers of industrial adhesives and textile finishes, who have outgrown their present quarters and require additional room for expansion. The two buildings are located at 622-630 West 51st Street and extend 200 feet to West 50th Street. The property is "L" shaped, six stories high, with two freight elevators and a total floor area of 105,000 square feet.

Improvement will be done in several stages. At present the offices and laboratories are being enlarged and modernized. Air conditioning and improved inter-office and inter-plant communications are being installed. Specially designed mixing equipment and processing kettles will, it is said, give the Paisley adhesive plant an additional capacity of one million pounds per month above their present production. In addition, Mr. Morningstar states, new high pressure steam boilers for processing and heating of the structures will be installed as soon as suitable equipment is available. A large portion of the property will also house the office and city warehouse of the Morningstar, Nicol organization, who operate their main Starch and Dextrine plants at Hawthorne, N. J., and Houlton, Maine.

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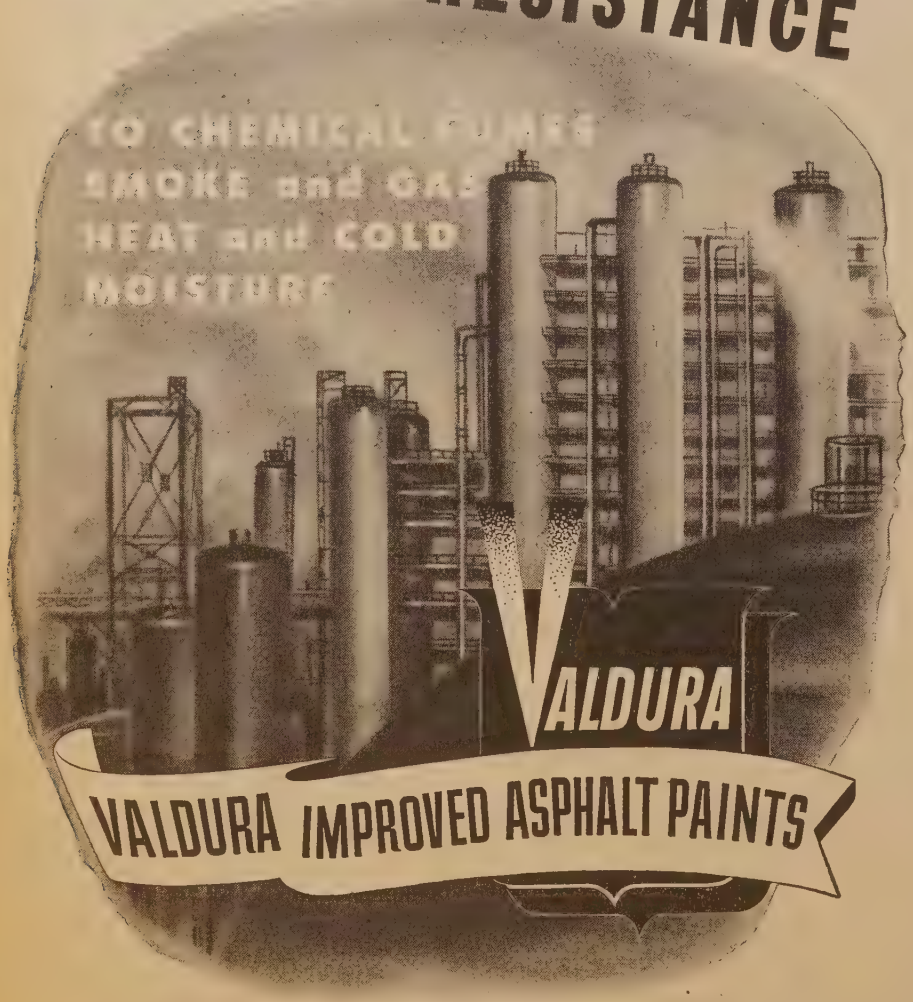

Valdura Improved Asphalt Paint, formulated with 99.5% pure Gilsonite Asphalt and Valdura processed oils combine science's most efficient waterproofing and preservative materials into a heavy duty paint with amazing resistance. It assures unsurpassed protection against rust, corrosion, chemical fumes, smoke, gas, moisture and extremes of temperature. Use it indoors or outdoors, above or below ground—wherever surface protection is important. Valdura Improved Asphalt Paint supplies a tough, elastic protective coating that will last for years. In most cases it requires no special surface preparation. Use it anywhere on any surface.

AMERICAN-MARIETTA COMPANY 43 E. Ohio Street, Chicago 11, Ill.

• Personals

Eugene W. Fuller

▲ Five changes in executive personnel of **Shakeproof, Inc.**, a division of Illinois Tool Works, have been made as part of the company's plans to meet new business demands. Eugene W. Fuller, division manager, has relinquished his additional position as sales manager to devote his entire time to management duties. B. F. Bales, formerly assistant sales manager, is now sales manager. Russell H. Maude, who has been associated with the automotive phase of Shakeproof, is now sales manager of the Detroit district and John B. O'Connor, former Detroit district sales manager, is chief engineer. Walter M. Hanneman has joined the SEMS licensee division as chief engineer to assist and counsel licensees in problems of design and production of SEMS. Shakeproof's main headquarters are in Chicago.

▲ Amos H. Carey has been appointed director of manufacturing for the **John Meck Industries** of Plymouth, Ind. Mr. Carey was formerly in charge of manufacturing for the Radio Corporation of America, Camden, N. J., and just prior to his appointment with John Meck Industries was factory manager for the Sprague Electric Co., North Adams, Mass.

▲ C. E. Herington has been appointed manager of the sales engineering department of **Meehanite Metal Corp.**, New Rochelle, N. Y. He will also continue his duties as director of advertising and sales promotion.

▲ Lee C. Daniels has been made chief engineer of **Towmotor Corp.**, Cleveland, Ohio, manufacturer of fork lift trucks and industrial tractors. He was for-

merly associated with The Oliver Corp., the Cleveland Tractor Co., Twin Coach Co. and White Motor Co.

▲ William E. McCormick has been appointed chief of the industrial hygiene department of the **B. F. Goodrich Co.** He was formerly in industrial hygiene work in the state health department of Georgia.

▲ **General Electric** Lamp Department, Nela Park, Cleveland, has announced four organization changes. T. W. Moore, for many years manager of the department's Southeastern sales district and for over 46 years with General Electric, has retired from active service. The Southeastern sales district has been divided into two districts. One is the Carolinas sales district and the other carries the former name of Southeastern district. Headquarters for the former are in Charlotte, N. C., and Glenn E. Park, who began his career with G. E. in 1919, is named manager. The Southeastern district has Atlanta, Ga., headquarters and new manager is L. J. Campbell, formerly assistant district manager under Mr. Moore.

C. E. Scott

▲ **The Rittling Corp.**, Buffalo, N. Y., has announced the appointment of C. E. Scott as vice president in charge of sales and advertising. Mr. Scott's former business affiliations include several years with the York Heating and Ventilating Corp. of Philadelphia and the Carrier Corp., Syracuse, N. Y. He organized the research laboratory of the former and developed the basic factor method for rating unit coolers. Later he served Warren Webster and Co., Camden, N. J., as sales supervisor for radiation, unit heater and air conditioning equipment. In 1941 he

(Continued on page 328)

SKINNER Chucks NEWS

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A modern power chuck is a precision mechanism and must be treated with the same respect as the machine on which it is used. Operators should be shown all lubrication points and given instructions on when and how to oil the chuck.

A good general rule to follow when ordering independent chucks is to specify a chuck diameter two to three inches less than the swing of the machine on which it will be used.

Attempting to hold oversize work in any chuck causes the jaws to overhang, imposing undue strains on the chuck parts and should be avoided whenever possible. Also be sure to support long work with tailstock center, as greater accuracy and more satisfactory results will be obtained.

SKINNER SAFETY

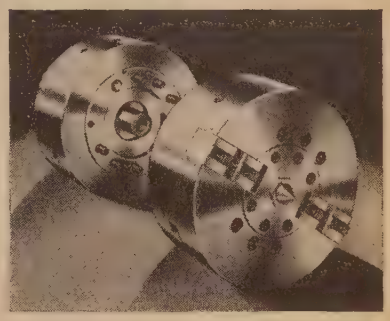
Did you know that a Skinner Wedge-type Power Chuck will hold even when the air supply has been cut off? Comprehensive tests have proved that a Skinner chuck grips the work just as solidly after the air supply has been cut off—a crowbar was used in a futile effort to loosen the work being held.

SKINNER chuckles

A tombstone usually speaks well of a man when he's down.

The good old days were those when there were two cars in every garage. Now, it's two families.

Skinner dealers are located in all principal cities — consult the one nearest you for complete details on Skinner products.



New Skinner Series 23100-A Chuck

NEW SKINNER COMPENSATING POWER CHUCK

With an Exceptionally Sturdy, Precision Center

New Britain, Conn. — Another new air chuck is being manufactured by the Skinner Chuck Company of this city. Called the 23100-A, it is a two-jaw compensating power chuck of a special design that facilitates driving uneven castings, rough forgings and similar hard-to-grip pieces on centers. The new chuck is especially useful where exceptionally heavy cuts are being taken with carbide tools at high spindle speeds.

Construction of the 23100-A is rugged and precise. All parts are made of selected alloy steels, specially heat-treated for their particular functions. The compensating action is provided by a unique design feature that links a rocker arm and plunger to the two floating, non-adjustable jaws.

The new 23100-A is a real value in a power chuck. It will speed machining of rough pieces by cutting down chucking time and assuring faster, more precise metal removal. And another thing — the new 23100-A is built to last — whether it's used intermittently or constantly, easily or severely — because it's built to Skinner standards of quality workmanship. For complete details see your Skinner dealer or send for catalog that covers all Skinner products.

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There are so many heavy lifting and moving jobs for which the Simplex Standard Speed Ball Bearing Industrial Jack is "tops" for ease, speed and safety. No. 2522 lifts its full rated capacity on the cap or the broad toe lift (10 sq. in.). Affords greater clearance above ground for easier operation because the enclosed ratchet mechanism is at the top of the Jack, instead of in the base as in journal Jacks. Send for Catalog 45.

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Chicago 44, Ill.
Better, Safer Jacks Since 1899

SIMPLEX
WORLD'S MOST COMPLETE LINE OF
JACKS
LEVER
SCREW
HYDRAULIC

(Continued from page 327)

joined The Fedders Manufacturing Co., Buffalo, where he had charge of the industrial heating division and later the refrigeration division.

▲ The **General Electric Co.** has appointed L. R. Boulware, vice president, formerly on the staff of the company's president, as general manager of the newly established affiliated manufacturing companies department. E. J. Harrington of Mr. Boulware's staff, has been named manufacturing manager of the new department. Roy W. Johnson, formerly vice president in charge of sales for Telechron, Inc., has been named marketing manager of the new department.

Affiliates include Carboloy Co., Inc., General Electric X-Ray Corp., Hotpoint, Inc., Locke Insulator Corp., the Monowatt Electric Corp., Telechron, Inc., and Trumbull Electric Manufacturing Co.

▲ **Thermoid Co.**, Trenton, N. J., announces appointment of Andrew Richardson in charge of factory personnel relations. Mr. Richardson has been with Thermoid for 26 years and heretofore has been in charge of grievance procedure.

▲ Named as district sales manager of the Philadelphia sales office of the **Carborundum Co.**, Niagara Falls, N. Y., is John G. Fritzinger who has been sales engineer for the Refractories Division of the company in the Philadelphia area since 1924. He succeeds Williard J. Griffith who

(Continued on page 330)

SUPERINTENDENT

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Manufacturers' sales representative desires position as Assistant to Sales Mgr. or District Representative—East Coast territory. 38 yrs. old, married, and has been eight yrs. in abrasive and small tool field. Has wide dealer and consumer acquaintance on Eastern Coast; was largely instrumental in growth of well-known line. Capable of creating and conducting aggressive dealer activities. Presently employed. Best references furnished. Address Box #360, MILL & FACTORY, 205 E. 42nd St., N. Y. 17, N. Y.

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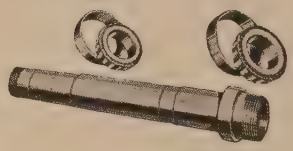
SHELDON
Precision Lathe



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New . . . a moderate priced lathe with precision unsurpassed at any price.

Other features include: 56" bed; full quick change gears; full double walled apron with worm driven longitudinal and cross feeds; taper gibbed compound and cross slide; 4-speed, V-belt underneath drive enclosed in pedestal of 5-drawn steel bench.

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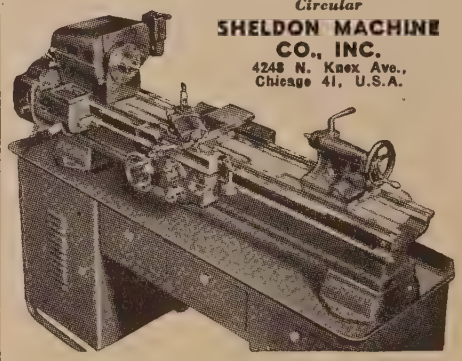

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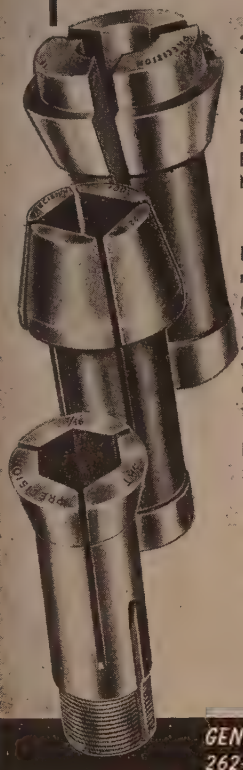
Precision Collets



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BROWN & SHARPE MACHINES AND
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HEX OR SQUARE Collets needed for that new job? Then say "*PRECISION Collets, please!*" to your industrial distributor. You'll get them now when you want them . . . *from stock.* And you'll get them as you want them . . . ground dead true, with a spring temper that spells assured performance, and with long life guaranteed.

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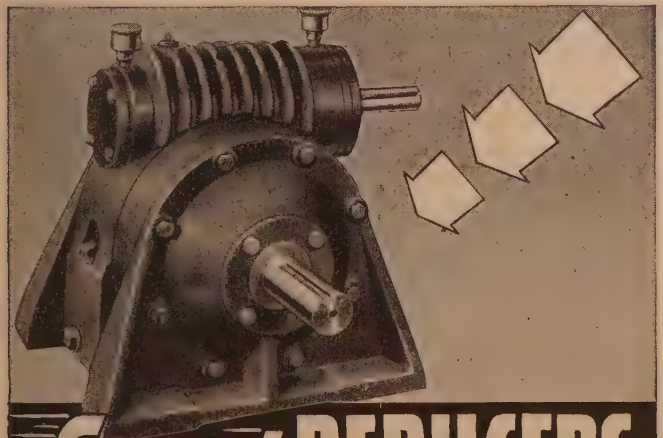

Speed REDUCERS

Do You Know . . . JANETTE Builds Both MOTORIZED and MOTORLESS SPEED REDUCERS . . . 32 styles and types of motorized and 20 motorless machines are available with foot or flange bases. ¶ Janette built motors are designed specially for driving Speed Reducers. ¶ Various types of motor enclosures, modifications, voltages, phases and speeds can be furnished. ¶ All Motors and Reducers are Built to ONE STANDARD OF QUALITY.

Janette — 1/30 to 7 1/2 H.P. .08 to 447 R.P.M.

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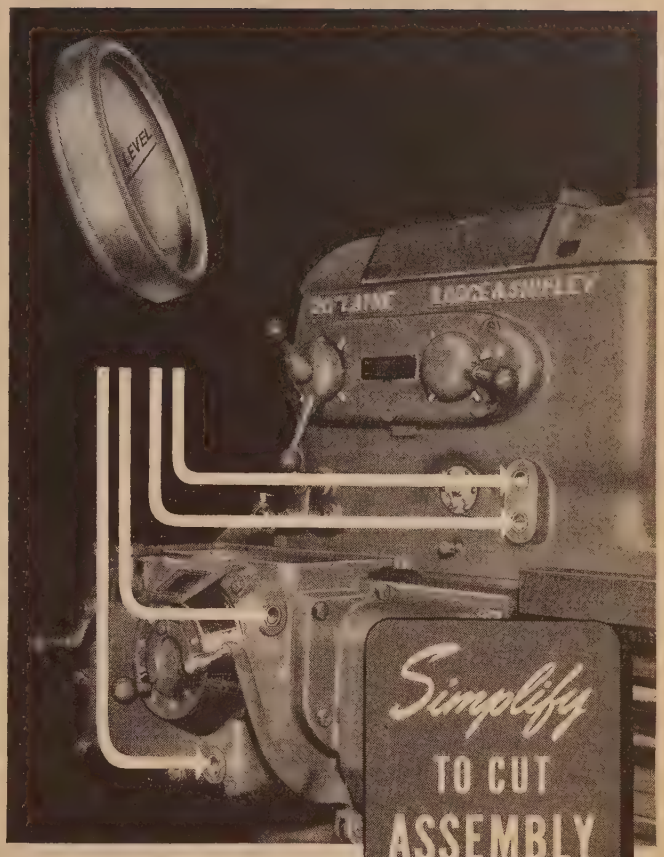
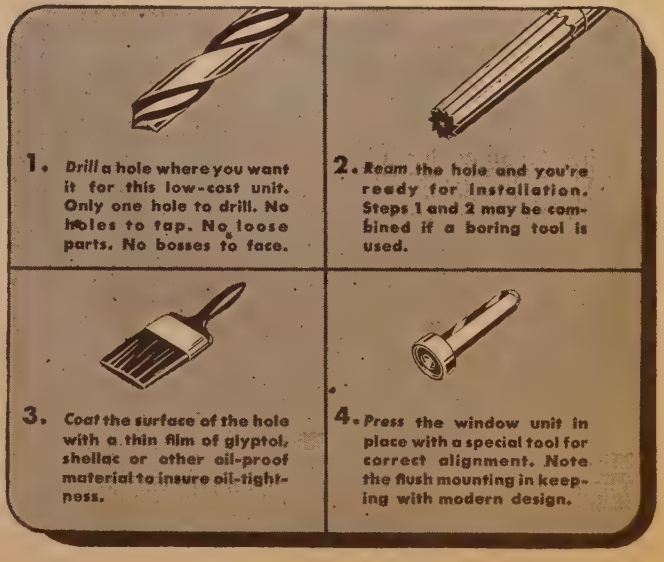
556 W. Monroe St. Chicago 6, Ill.



Simplify TO CUT ASSEMBLY COSTS

Specify a self-contained ONE-PIECE window unit. No gaskets. No screws. No loose parts.



1. *Drill* a hole where you want it for this low-cost unit. Only one hole to drill. No holes to tap. No loose parts. No bosses to face.

2. *Ream* the hole and you're ready for installation. Steps 1 and 2 may be combined if a boring tool is used.

3. *Coat* the surface of the hole with a thin film of glyptol, shellac or other oil-proof material to insure oil-tightness.

4. *Press* the window unit in place with a special tool for correct alignment. Note the flush mounting in keeping with modern design.

. . . for indicating liquid level, flow or drip, and for observation of the position or movement of parts, such as gear mesh, timing marks, and other internal mechanisms.

BIJUR

Write for bulletin 4B

BIJUR LUBRICATING CORPORATION
43-21 22nd St. Long Island City 1, N. Y.

(Continued from page 328)

has resigned to form an industrial supply company with Paul E. Raguse. Principal business of the new company will be distribution of Carborundum products in the Philadelphia metropolitan area.

▲ S. E. Voran has been made advertising manager of **Parker Appliance Co.**, Cleveland, Ohio. Prior to joining Parker he had served as account executive for Fuller, Smith and Ross, Inc.

▲ **Federal Electric Products Co.**, Newark, N. J., has appointed two new vice presidents, W. H. Lantz, Jr., of Hartford and Rey F. Frenger of St. Louis. Mr. Lantz, who came to Federal in 1941, will be executive head of the Hartford division. Mr. Frenger, who joined the company last year, will head the Wm. Wurdack division in St. Louis.

▲ Following recent expansion of the experimental department, three new members have been added to the engineering staff of the **Rapids - Standard Co., Inc.**, Grand Rapids, Mich. Everett Lane, formerly with Gulf Oil Co., is engaged in product design and development with Rapids-Standard. Robert Nelson, formerly with Chrysler Engineering department, is a member of the experiment and development department to engineer electrical installation of Rapids - Standard equipment, and Peter Koster, formerly with General Motors and Lear Radio, Inc., is engaged in tool design.

▲ Robert A. Wahl has been made sales manager of Union Steel Castings Div., **Blaw - Knox Co.** He has been with the company since 1937.

▲ **The Hyster Co.** has announced appointment of Dan J. Sheehan as manager of the Danville, Ill., plant. For 14 years he has been superintendent of motive power for the Chicago and Eastern Illinois Railroad in Danville.

▲ Appointed as director of Headquarters Wage Incentives for **Westinghouse Electric Corp.** is John W. Reichenbach who started with the company as a coil winder in 1916. Mr. Reichenbach will be responsible for developing material for training personnel, assisting in promoting uniform administration of wage incentive policies, and developing procedures that tend toward higher productivity and lower costs. He has been director of wage incentives for the East Pittsburgh Division.

▲ Frank M. Clark, insulation expert at the Pittsfield Works of **General Electric Company's** apparatus department and assistant engineer of the works laboratory there, has been named technical consultant on insulation of the entire apparatus department.

▲ **Sylvania Electric Products, Inc.** has appointed Henry W. Parker as technical adviser. The post has been created to stimulate review of industrial and scientific developments of interest to the central engineering laboratories and to propose new projects in research and development. Mr. Parker has recently been cooperating with the U. S. Department of Commerce in connection with a study of electron tube developments in Germany and Japan during the war.

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You can depend on Signode Steel Strapping to give maximum protection to goods in transit from cartons and small boxes to heavy palletized units and carloads.

Forty-one branch offices—in eight major shipping areas—provide fast, nation-wide service on tools, steel strapping and seals—the basic elements in Signode's complete system of PLANNED PROTECTION for all types of shipping containers. The Signode SYSTEM cuts transit damage and helps to reduce shipping room expense.

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No need to substitute for VALLEY—for we are making deliveries as quickly as possible to all who are authorized to purchase. And, since VALLEY Motors have proved their capacity for economical and faithful service in thousands of war plants *everywhere*, you are assured of satisfactory performance.

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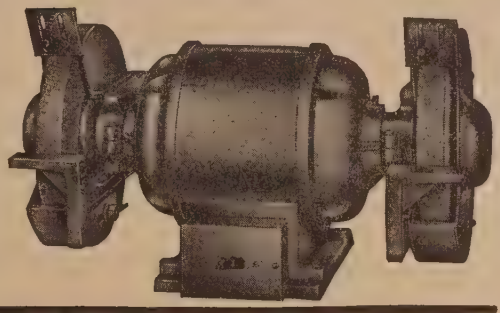

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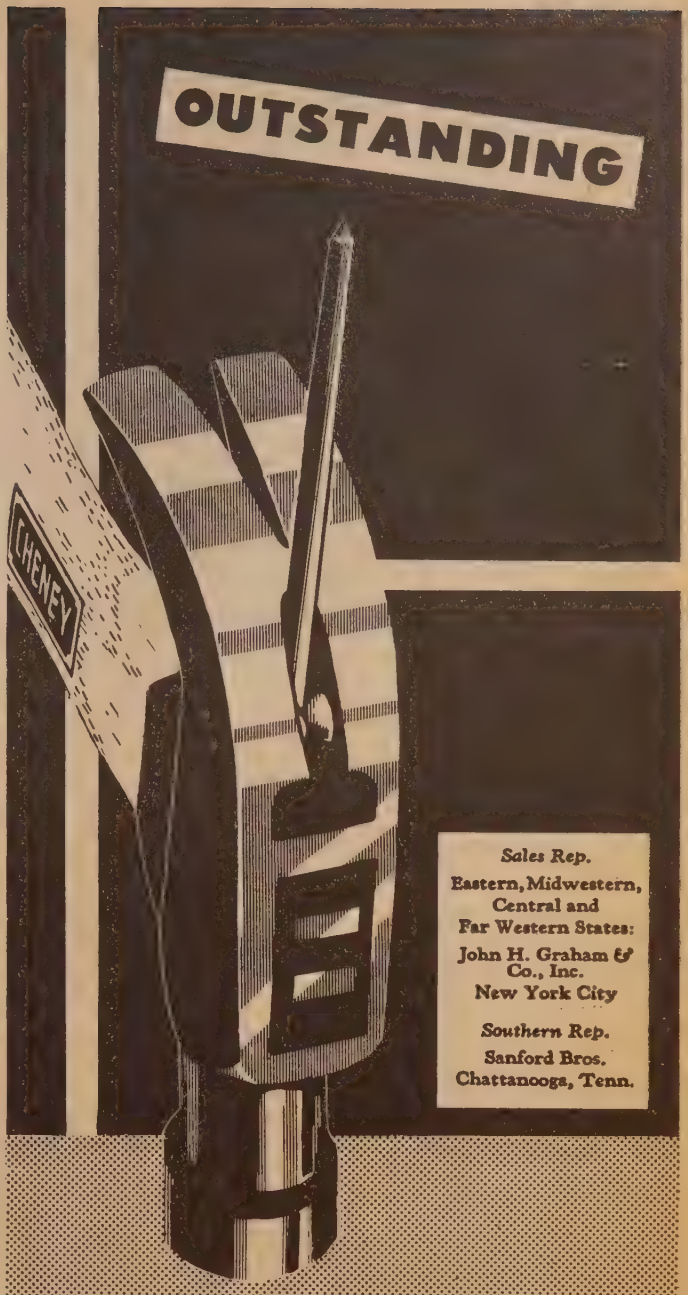
"If anyone calls, Miss Keen, I'll be at the Collector of Internal Revenue discussing my income tax payments."



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FOR THE *Best* SOLDERING JOB
USE THE *Best* FLUX

KESTER FLUXES

Photo courtesy General Electric X-Ray Corporation

• The best flux for any soldering job is the right flux. And Kester has the right flux for you.

• Nearly half a century of solder experience has resulted in the development by Kester of hundreds of flux formulas. Extensive testing—both in the laboratory and in the plant—provides Kester with complete knowledge of the performance of each flux. The circumstances under which each flux may best be used have been accurately determined.

• Sweating operations—delicate dip-soldered electrical connections—all kinds of seaming—for any type of soldering job, there's a right and specific Kester flux to assure you of tight, trouble-free solder bonds.

• Consult Kester engineers whenever you have solder problems. At no obligation to you, they'll gladly recommend the right flux formula to insure the best results from any operation.

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Eastern Plant: Newark, N. J.
Canadian Plant: Brantford, Ont.

KESTER
Solder Fluxes
STANDARD FOR INDUSTRY

SEE HERE!

ARITHMETICAL HEADLINE

A headline that sticks in our mind is this one used by a New York radio store, "Philco Radios are 10 Years Ahead of 4 Years Ago in Performance." If the formula is simple arithmetic, it is just a matter of subtracting 4 from 10, leaving 6. Add 6 to 1947 and the headline is merely a roundabout way of saying that Philco radios are now up to 1953 in performance.

But what worries us is that geometrical progression may be involved. Thus if eight years ago Philcos were only one year ahead, they are now well past the year 2000. What *is* the formula, Philco?

STOPPERS

Candy for cows cools off on rubber—*B. F. Goodrich Co.*

This Piece of Rope is Doomed.—*Bethlehem Steel Co.*

STOP START STOP

We were mistaken in assuming that H. Dickson S. Boenning of Philadelphia has the only name in existence with a double part. He must share the honors with the new Under-Secretary of Treasury, A. Lee M. Wiggins.

NAME OF DISTINCTION

One of the John Smiths attained fame, but the circumstances were unusual and the population was small. A name that can be confused with no other confers a certain distinction on its possessor.

The most distinctive name we have run across lately is that of a consulting engineer, who spoke at a recent conference of the Soaring Society of America. The name is Zbigniew Krzywoblocki. The subject was rocket-assisted take-offs. A clear case of predestination.

MAINTENANCE MANUALS BEST SELLERS

Jet propulsion seems to be behind the demand for the handy eight-page Maintenance Manuals that have been appearing serially in MILL & FACTORY since September 1945. See Page 137 for this month's Manual. Over 20,000 copies (10c a copy) have been ordered to date; we have run completely out of No. 1 (Chain and electric hoists). Stocks of many others are running low, but at this writing we are still able to supply manuals on these 17 subjects:

Rubber Belts
Electric Motors
Wire Rope
Lighting Equipment
Anti-Friction Bearings
Portable Electric Tools
Industrial Power Trucks
Valves
Leather Belts
Roofing and Flooring
Electric Controls
Transmission Chains
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Pumps
Conveyors
Gear Drives

Send $1.70 for the set, and add $1.50 if you want a special fabrikoid binder. Our bookkeepers will bless you if you send payment with order. The address is 205 East 42nd Street, New York 17, N. Y.

DESIGNER'S FRIEND, TOO

We published the Maintenance Manuals to help manufacturers keep their plant housekeeping costs

... By G. H. Dix

down, but Nathaniel Warshaw, of the Market Forge Co., Everett, Mass., mentions another use:

"These Manuals not only serve a useful purpose in the plant for maintenance but are excellent reminders to designers to incorporate in their designs the simplicity necessary for proper maintenance of equipment."

PRO AND CON JUXTAPOSE

Robert Nathan and we are hardly economic blood brothers but we can thank him for timing his higher-wages-no-price-increase blast for the CIO so that it came out just at the moment our editors had completed the extensive wage-price survey you saw in the "Report to Industry" of the December MILL & FACTORY.

As a result of the fortuitous split-second timing, our editors' spade work was front-paged by metropolitan newspapers, (New York Sun, Chicago Sun, Pittsburgh Press, New York Herald Tribune, Chicago Tribune, New York Journal-American, Chicago News, etc.) and was featured by the high-Crossley radio commentators.

Excluding the market publications MILL & FACTORY *is, as we keep saying, the country's most widely quoted trade paper.*

INQUIRY RECORD EXCITES ADVERTISER

An advertising space buyer we were talking to the other day got excited when we mentioned offhand that during the past year you and the other thousands of our readers had mailed in 35,535 requests for industrial literature and information about new products.

According to him, this is some kind of a record for our type of publication. He added something about it being the most striking evidence of reader interest that he had ever seen, and said we ought to boast about it in block type.

But we won't, as we are modest, and furthermore we take it for granted as the natural result of a chain of conditions:

(1) MILL & FACTORY reaches the key executives in every worthwhile plant; (2) our editors make the magazine valuable so that it gets unusually careful reading; (3) the literature contains useful information. So why shouldn't the volume of the requests strain the seams of the postman's pouch?

For the current month's offerings, see page 164.

WE CHOSE THE VIOLET

To castigate our natural modesty we make it a point of publishing here an occasional bloom plucked from the unending stream of bouquets bestowed on our editors. The orchid of the month is unquestionably one tossed by a Midwestern manufacturer whose affection for MILL & FACTORY has moved him to lyrical heights comparable to what Elizabeth Barrett inspired in Browning.

But it is a little too heady for our taste, so we will substitute this simple little violet offered by a Vermont manufacturer, who is said to be a man addicted to conservative statement:

"I would rather have it (MILL & FACTORY) than all other similar publications put together."

NON-FLUID OIL
TRADE MARK REGISTERED

NON-FLUID OIL arrests friction because it provides positive lubrication upon split-second demand as soon as your machinery starts up. It does not have to be aided or softened by frictional heat before starting to lubricate—as is the case with ordinary greases. In fact, NON-FLUID OIL keeps bearings noticeably cooler.

Furthermore, it outlasts grease several times, its greater durability being especially marked when it is used in warm weather or on machinery in hot locations. Under such conditions grease melts and wastes freely, but NON-FLUID OIL retains its consistency, not being affected by temperature changes.

NON-FLUID OIL, the modern lubricant, is produced from the very highest grade petroleum. A special process enables it to overcome the drawbacks of oil and grease. It is produced in grades exactly adapted to the lubrication of every type of machine. NON-FLUID OIL is applied in the same way as liquid oils and greases and does not require the purchase of any special lubricating appliances or any changes in lubricating technique.

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Current Quote

"Since using NON-FLUID OIL we have practically eliminated bearing failures which we had experienced in the past."

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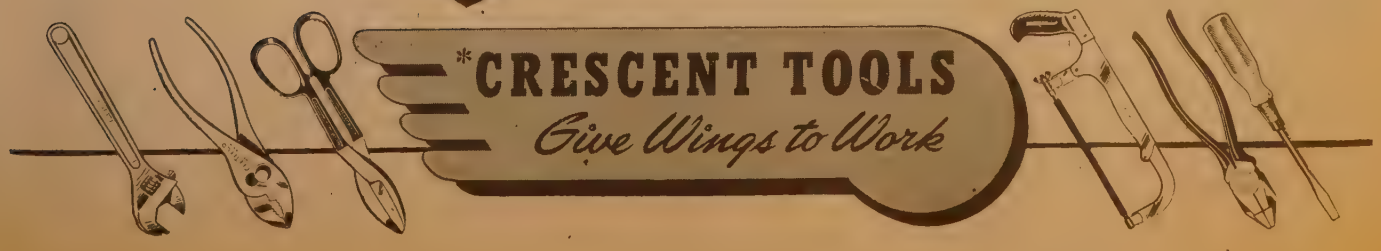
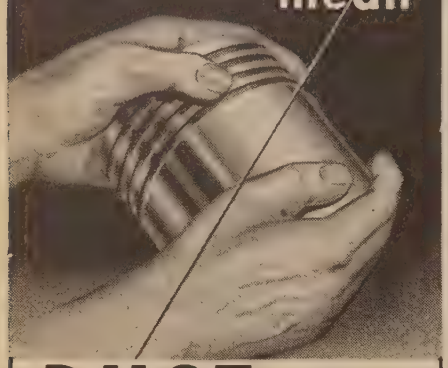


FINGERprints ON METAL mean



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NOX-RUST 310-AC gives 4-way protection

Workmen handling metal leave their finger marks on every part they touch . . . finger marks soon become rust marks because corrosive perspiration is left with every print.

Nox-Rust 310-AC, a surface active rust preventive, readily removes fingerprints by squeezing off moisture. Quickly and easily applied, 310-AC is the perfect economical answer to intraplant protection of all metal parts and assemblies.

Nox-Rust 310-AC works four ways to insure rust-free precision surfaces:

1. Removes fingerprints.
2. Protects metal from vapor residues common in factories.
3. Guards from coolant corrosion after machining operations.
4. Rust proofs parts in storage.

Corrosive fingerprint on panel shown above (left) gives perfect entrance to rust unless moisture is removed with Nox-Rust 310-AC as shown on panel at right.

NOX-RUST CHEMICAL CORPORATION
2433 So. Halsted St. Chicago 8, Illinois

Send full information and prices on Nox-Rust 310-AC.

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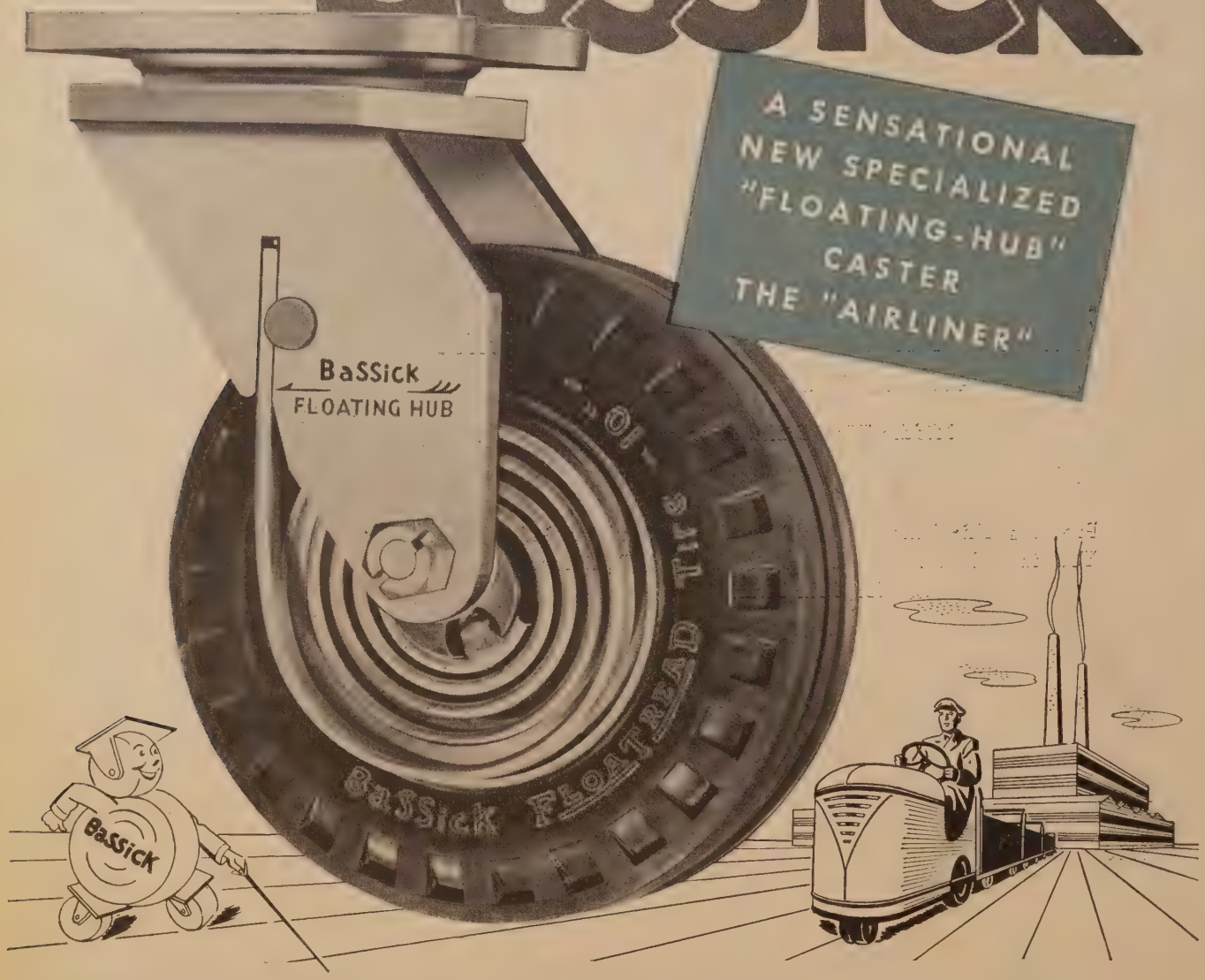

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SURVEY OF THE MONTH

What Is the Trend in PRICES?

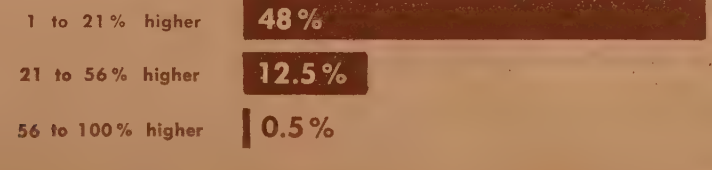
This MILL & FACTORY survey, made among all types and sizes of manufacturing companies, is designed to learn what has happened to prices of manufactured goods since ceilings were removed last November and what is the prospect of future prices.

THE SURVEY SHOWS:

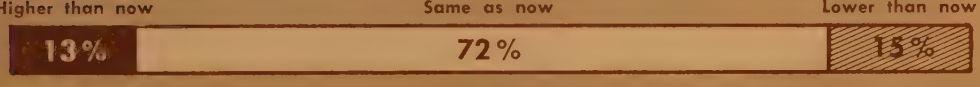
1. That higher prices are reported by 61% of the respondents.
2. By the summer of 1947, 15% of the respondents expect their prices to be lower; 13% expect them to be higher, and 72% expect prices to remain the same.
3. There are 51% of the respondents who feel that within the next two years they can sell their products at materially lower prices, due to increased productivity, improved labor efficiency, and technological advances.
4. Only 2% of the respondents feel that their products are now priced too low; 44% feel they are too high.
5. Business is in for a sharp but short-lived recession during 1947, 48% of the respondents predict.

1. In general, what has happened to the prices of your manufactured products since price ceilings were removed in November 1946?

(Percentage price increase of those stating that their prices are higher follows:)

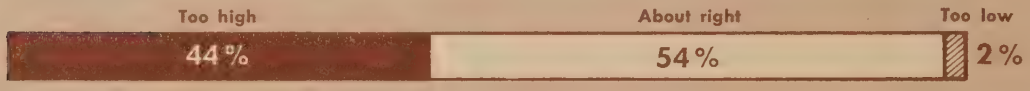


2. Barring any general wage increases, strikes and other uncontrollable factors, do you believe that by the summer of 1947 the prices of your manufactured products will be?



3. Assuming that wages will remain at their present level, do you feel that within the next two years increased productivity in your plant, due to improved labor efficiency and technological advances, will permit you to sell your products at materially lower prices?

4. Due to present high manufacturing costs, many manufacturers seem to think that their products are priced too high for their normal market. How do you feel your products are now priced?



5. Do you believe that business is in for a sharp but short-lived recession sometime during 1947, as many economists would have us believe?

Comments from Respondents

"Prices much beyond normalcy due to many diverse reasons and which some day — perhaps sooner than many of us think today — will level off materially, but not to prewar."

West coast small parts company.

"Statistically, prices based on raw materials, labor, and increased demand in our industry, should stay at present levels. What the psychological effect on the part of buyers at high price of labor for application of products of our industry plus the higher prices of our products themselves will be is anyone's guess. How to learn to do without is a war-learned lesson."

Eastern manufacturing company.

"Our economy is headed for a downward trend, which is to say that we will have a series of 'dips' until our equilibrium between costs based on reasonable efficiency is the order of the day. We look for an over-all 25% reduction in consumers' prices before business can be stabilized."

West coast manufacturing company.

"It is the first objective of the manufacturer to supply a better product at a lower price. Increased wages, higher material costs must be overcome by improved design, investment in labor-saving machinery, better supervision and incentive pay based on production. A large percentage of manufacturers are striving to accomplish such results, and thus make a contribution to lower living costs."

Eastern small parts manufacturer.

"We have had two price increases . . . both necessary, but we are pricing our product out of the market. Even now we are experiencing some reactions, and feel sure the latest increase will accelerate this situation."

Midwestern manufacturing Co.

"Labor rates should remain as they now are except for adjustments due to inequalities, and costs of finished products should level off so that lower prices can be effected by fall."

Midwestern manufacturing company.

". . . Within the last few weeks we have received increases in prices from a number of different suppliers averaging from 50 to 100%. These suppliers make products which do not go direct to the ultimate consumers. They go to manufacturers like ourselves. I am beginning to wonder if some of these prime suppliers have lost touch with the consumers' market and whether they realize change in the attitude of the consuming public. . . . People are becoming somewhat more careful as to what they buy and what they pay for it . . ."

New England tool manufacturer.

"Prices of some manufactured articles will have to be increased to reflect price adjustments in materials. Some may be lowered for same reason."

Eastern manufacturing company.

"Prices on products manufactured by us . . . are established on the basis of at least 95% efficiency on the part of our employes. . . . The efficiency is increasing and . . . with increased efficiency, competition will bring about a reduction in prices by mid-1947 — that is, in the event there is no change in the existing material costs or employe wage rates."

Midwestern automotive parts manufacturer.

"We are in favor of keeping our prices low enough to insure our plant operating at or near peak capacity at all times. At present we are 8 months or so behind our orders which naturally affects adversely our service to our customers."

Eastern manufacturing company.

A. N. Wecksler,
Washington Editor

Boldest forecast from responsible sources in official Washington is:

1. There will be ***no recession this year.***

2. Overall prices are not due to come down, except in an erratic manner, with some products falling into a more moderate price range. The full rise in overall prices has not yet been reached.

3. While farm prices may fall, processed food prices will remain high — due to the ***high costs of labor and handling*** in the processing, and of transportation.

4. The labor market will remain tight, especially in the ***demand for skilled labor.***

This forecast was made by a top economist in the Department of Commerce, who has consistently disagreed with some of the alarmist predictions — which reached their fullest flower with the Government sponsored prediction of an 8,000,000 unemployed level after VJ-Day.

The thinking behind the prediction that ***prices have not risen as high as they will go,*** is that incomes have out-distanced production — and that to bring them into balance, prices will go up.

There will be spectacular drops — as in the case of butter — but after the lower levels are hit, prices begin to firm up and to rise again.

This theory is substantiated, in part at least, by the ***increase in basic material prices.*** The same source also discounts all the talk of huge accumulated inventories.

This is one side of the picture, and comes from a very responsible source. It is only fair to mention that there is an equally vocal group in the Department of Commerce that says the ***seller's market is on the wane;*** that prices are on the way down — but that the price decline must accelerate sharply if a consistent high level of demand is to be sustained.

Example is cited of the huge ***markdowns in furs*** and similar luxury goods. However, it is admitted that producers of these luxury lines are not marking down their new production; they are merely trimming their sails, and taking their losses on style items.

On the labor front, Department of Labor officials view the market as presenting a ***solid period of high employment.*** Hiring is tapering off in manufacturing. Most industries are fully staffed; are on a replacement basis. This is certainly true of cotton textiles, where several months ago, employers indicated a need for 50,000 additional workers. Now they claim that 10,000 are needed to fill the gaps created by turnover.

To offset this lesser demand for new hires in manufacture is an anticipated requirement for ***on-the-site construction labor*** — actually double the current employment. This would mean that on-the-site construction labor would increase from its present level of roughly 1,250,000 to 2,500,000.

This increase will have direct impact on manufacturing in two ways. First, the demand for skilled construction labor will exert a real ***drain on maintenance workers in plants.***

Another factor is that the large demand for on-the-site workers will create a real pull on the labor market in various communities. There will be a ***slackening of the labor market for a month*** or two in the early spring, and then it is likely to tighten up again.

Wages for on-the-site construction workers will definitely compete with plant wages in many areas.

As an example, there will be a ***large demand for bricklayers.*** Hourly union scale for bricklayers ranges, according to a recent study of rates in 75 cities, from $1.62 an hour in Jacksonville, Fla., to $2.25 an hour in Memphis, Tenn.

Common labor on on-the-site construction gets a union hourly wage of from $1.20 an hour to as high as $1.37½ an hour in Cleveland.

There is some differential in the pay of workers on industrial construction and on housing. Builders of housing cannot afford to pay the industrial rate. On the other hand, during periods of labor shortage, the ***differential tends to close.***

If estimates of construction labor requirements are correct (prepared by the Bureau of Labor Statistics of the Department of Labor), there will be a definite shortage of skilled construction workers — and toward the fall of this year, the demand for such workers could well result in ***raids on the industrial labor force.***

Despite this outlook, there is some indication of a steadying in the labor force. There is a ***decline in the quit rate*** — slight, but consistent over a period of three months. Even with this moderation, the quits are running about four times the rate recorded in corresponding periods of 1939.

Overture by AFofL for a get-together with CIO is considered in most quarters to be ***mere shadow-boxing.***

No one within the Federation or the CIO is willing to look upon a wedding of their two organizations with anything beyond skepticism.

This is not the first time the proposal has come up. The CIO has made several such proposals. This time the AFofL suggestion developed out of the

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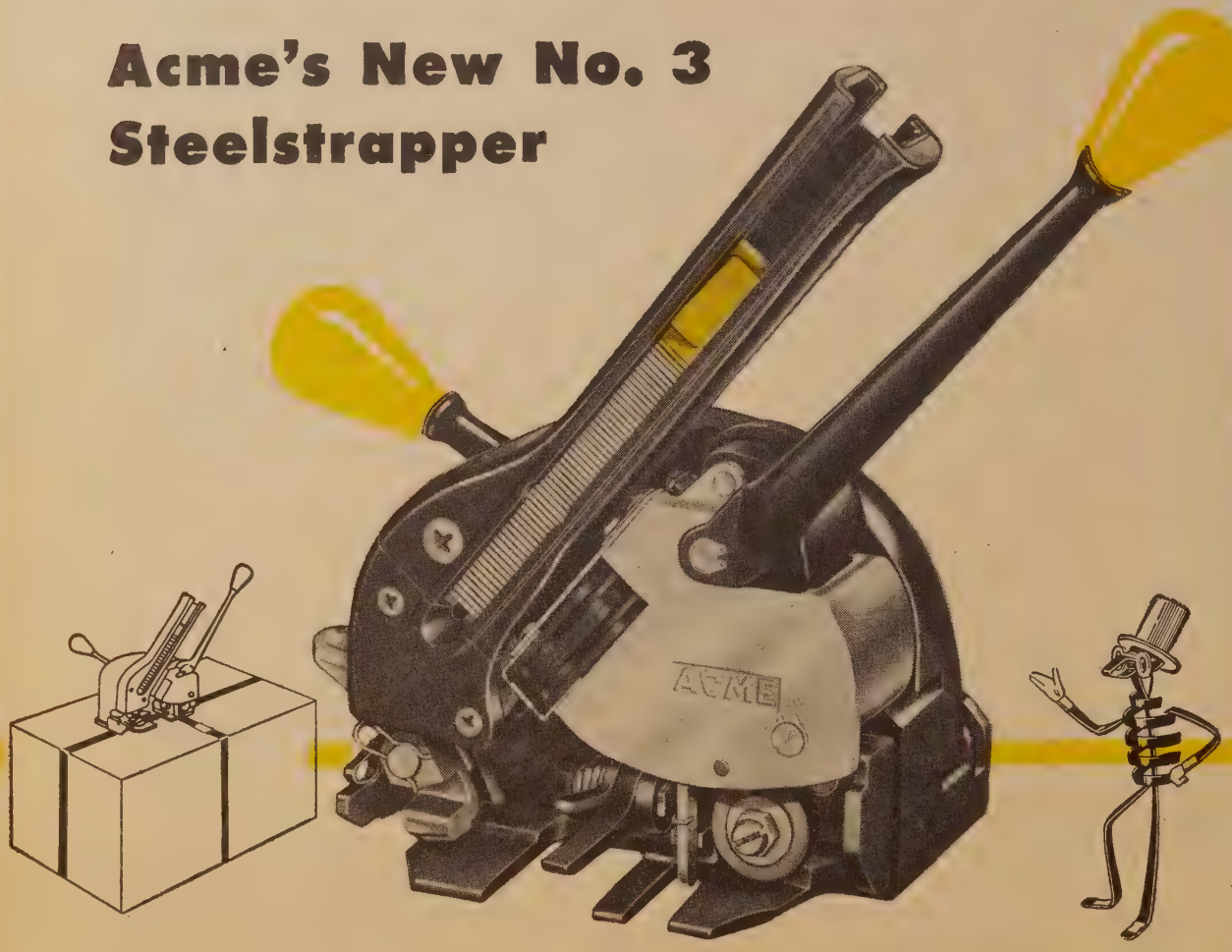

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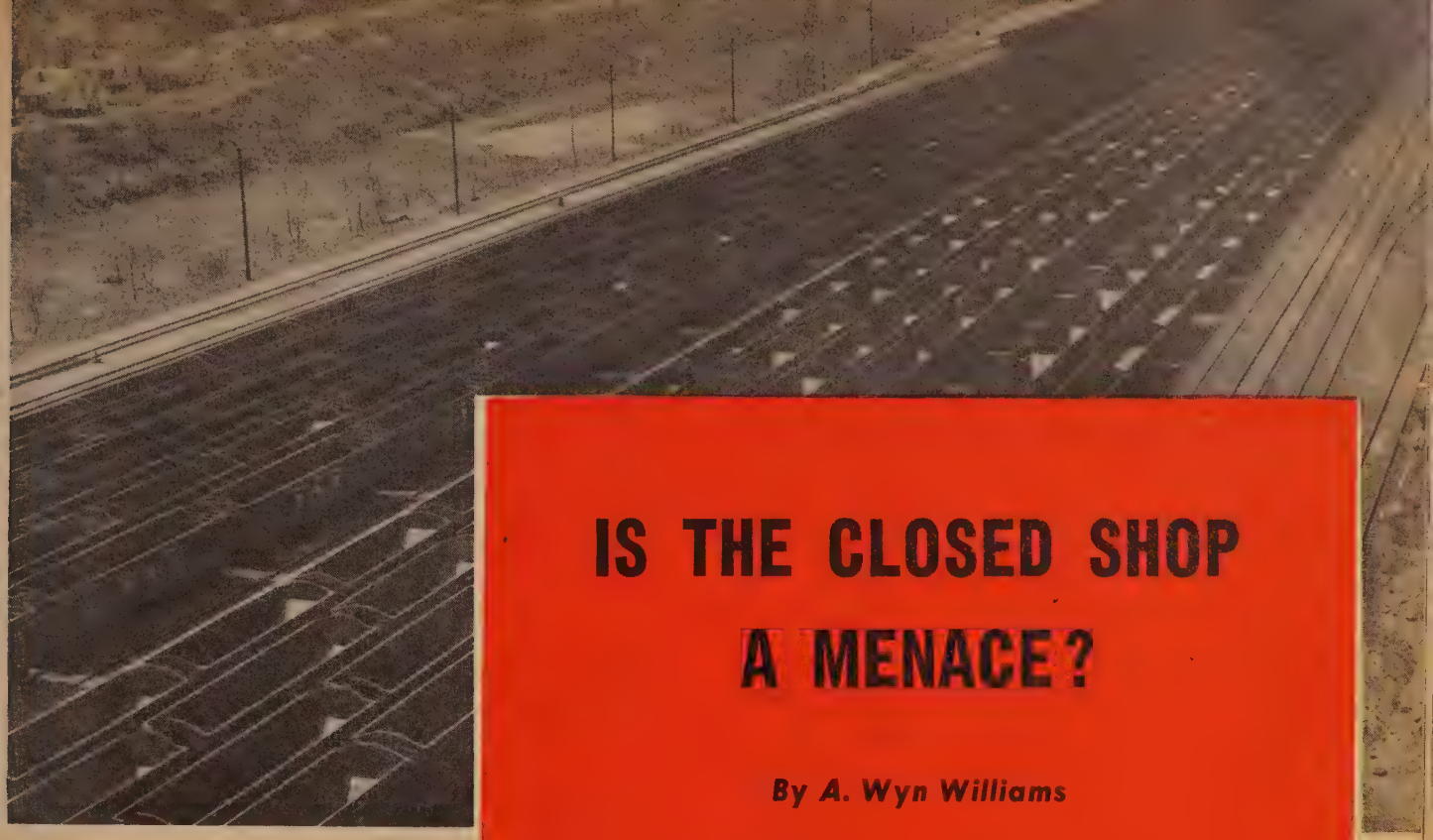


Acme

These coal cars are empty as a result of a strike in a closed shop industry.

IS THE CLOSED SHOP A MENACE?

By A. Wyn Williams

THE issue of the closed shop is not a new one. Only its form and its intensity have caused it suddenly to come to the foreground of public discussion, in the United States as well as in Great Britain.

Even before the real beginning of the modern industrial era, there was a strict supervision of those who could practise a trade and a restriction on their number. This was generally done by limiting the number of apprentices, whose number was kept down—sometimes even by laws—to what was considered adequate for safeguarding the livelihood of the craftsmen already in the trade.

But there was one vast difference between the exclusiveness of the crafts in the pre-machine age and that of trade unions in the mass production era. In the former case, with the exclusion of all except qualified persons, went the guarantee that the limited number permitted to work at a trade were all qualified to do so and had passed rigorous tests of craftmanship efficiency.

Exclusive membership in a craft was not to be gained, as too often happens in the closed shop of a trade union today, by merely demonstrating a willingness to pay an initiation fee, often an exorbitant one, in order to get in and promising to faithfully pay maintenance dues ever after. Whatever else that could be said against the restrictive character of the pre-machine age crafts, it could never be said that conditions of membership lowered productive efficiency. Quite the reverse, membership in them was a guarantee of high performance.

With the advent of the machine age, and the need of ever lesser skill to turn out the products that only qualified craftsmen could once turn out, the need for apprenticeship tended to disappear. This resulted in the disappearance also of one vital method of restricting the number of those who could enter any trade. The machines of the vast factories that sprang up at the beginning of the industrial era were manned, not by carefully selected workmen who had passed

BRIEFED: The closed shop is not a new phenomenon. It existed in the late middle ages, when the all-powerful guilds fought pitched battles with the kings of France and England and established a labor tyranny which completely ruined both the employers and workmen. The recent growth in size and power of labor unions again focuses attention on the good and bad features of the closed shop. Does it actually benefit the worker? Or does it put him in a union straightjacket, with a union boss controlling his livelihood?

through painful years of apprenticeship but by practically anyone, without regard to previous experience, so long as he or she possessed two hands and fair vision.

Thus there was no exclusiveness about who could work in an industry at the beginning of this era, except in the case of crafts whose skill had not yet been absorbed into the operations of a machine. When eventually this exclusiveness did begin to make its appearance among the tenders of machines, with the rise of trade unions, the emphasis had changed from what it was in the case of the crafts in the pre-machine age.

While the pretext was still the safeguarding of the livelihood of the worker, the chief purpose in mind was not the maintenance of productive efficiency in the industry but the protection of the bargaining position of those in a union against menace from those outside. Thus, alongside the growth of collective bargaining sprang the urge to restrict those who could work in an industry, not to the ones meeting a certain standard of efficiency, but to those who made their monetary contribution to the agency that set itself up as the agency for collective bargaining. In other words, from about the middle of the 19th Century there has been an ever growing effort by trade unions to confine the right to work to those becoming members.

The attempt to enforce a closed shop is therefore not a new thing even in the modern industrial era, and through the connivance of employers with trade union officials the principle of the closed shop has long been standard practice in certain segments of both American and British industry. It has, however, only lately become the subject of general public interest and of considerable alarm, because of the implications.

Restriction of Closed Shop

In the United States this alarm is not only attested to by the activities of the new Congress but also by the fact of the closed shop having been barred already in five states: Florida, Arkansas, Nebraska, Arizona, and South Dakota (three of these barred the closed shop by referendum in last November's election). The attitude of the opponents of the closed shop in this country is typified by the remarks of Senator Ball of Minnesota, when he announced his intention of spearheading an attack on it. Said he: "Agency control of individual rights is not liberal. The closed shop is the most illiberal thing we've got in our picture."

In Britain it has suddenly become an equally burning question. There was a thorough threshing out of the issue, last October, at the annual meeting of the all powerful British Trade Union Congress. This was followed in November by a full discussion of its implications in the British Parliament. In both discussions there were sneering references to the closed shop as an American innovation, a charge that is entirely untrue, but due probably to the fact that the matter has come to the public notice here.

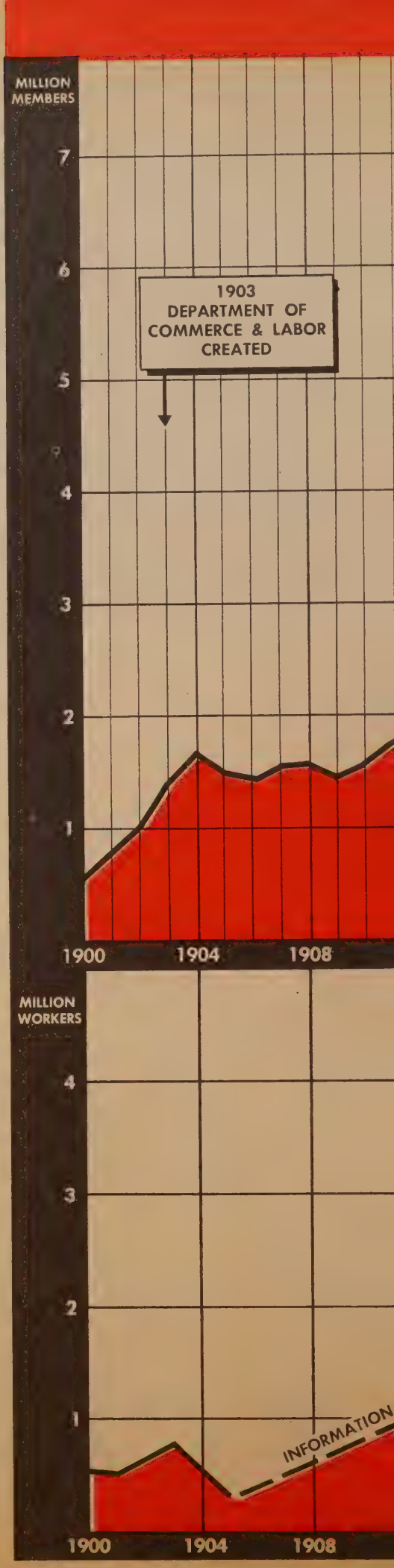
Said W. J. Brown, M. P., (himself a trade union leader) in the British Parliament on November 19, 1946: "If one goes to the place where the closed shop is most freely operated, the United States of America, one will find instance after instance there of corruption which I am perfectly certain the English Trade Union movement, while it is free, would never dream of tolerating for a moment...I think the closed shop is bad for the trade union."

If the closed shop has existed for a long time, what suddenly has focussed public attention on its implications both here and in Britain? It is the boldness with which the unions are insisting on the extension of the principle, due to circumstances temporarily favorable to their cause.

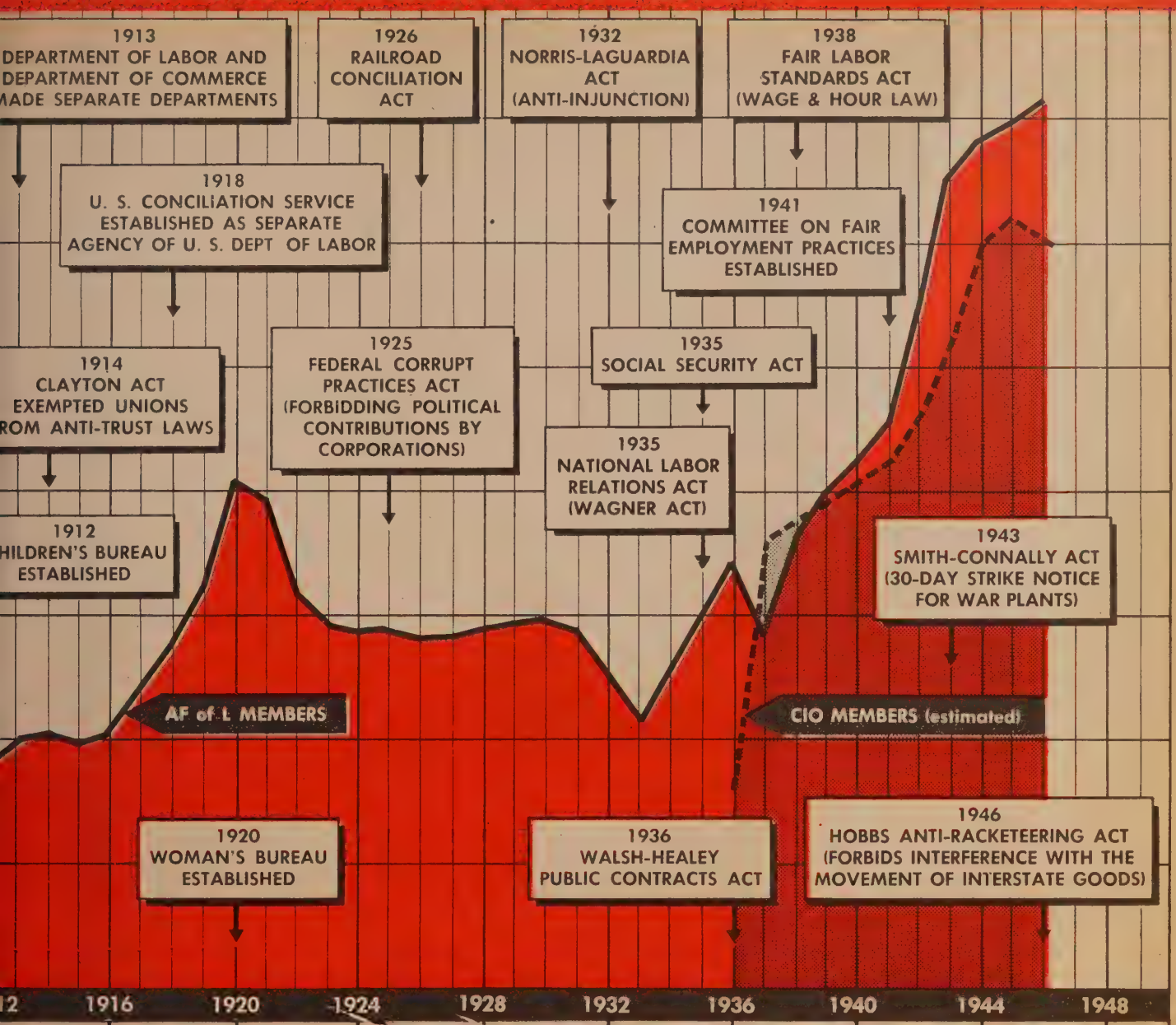
In the United States the Wagner Act, with its compulsory granting of the closed shop under certain conditions, has been the impelling force. In Britain it is the repeal by the Socialist Government of the 1927 Trades Dispute Act, that tried to restrict some of the excess of trade unionism, that has emboldened the drive for the closed shop.

While accurate knowledge of what collective bargaining contracts call for the closed shop in this country is not available, all evidence points to the fact that the trend for insisting upon it is increasing. One estimate claims that a closed shop or its twin brother arrangement, the union shop, forms a clause in well over 70% of collective contracts now in force against less than half this in force five years ago and only an infinitesimal number a decade ago.

The evidence is equally irrefutable that, up to the past summer, unions were getting to insist more

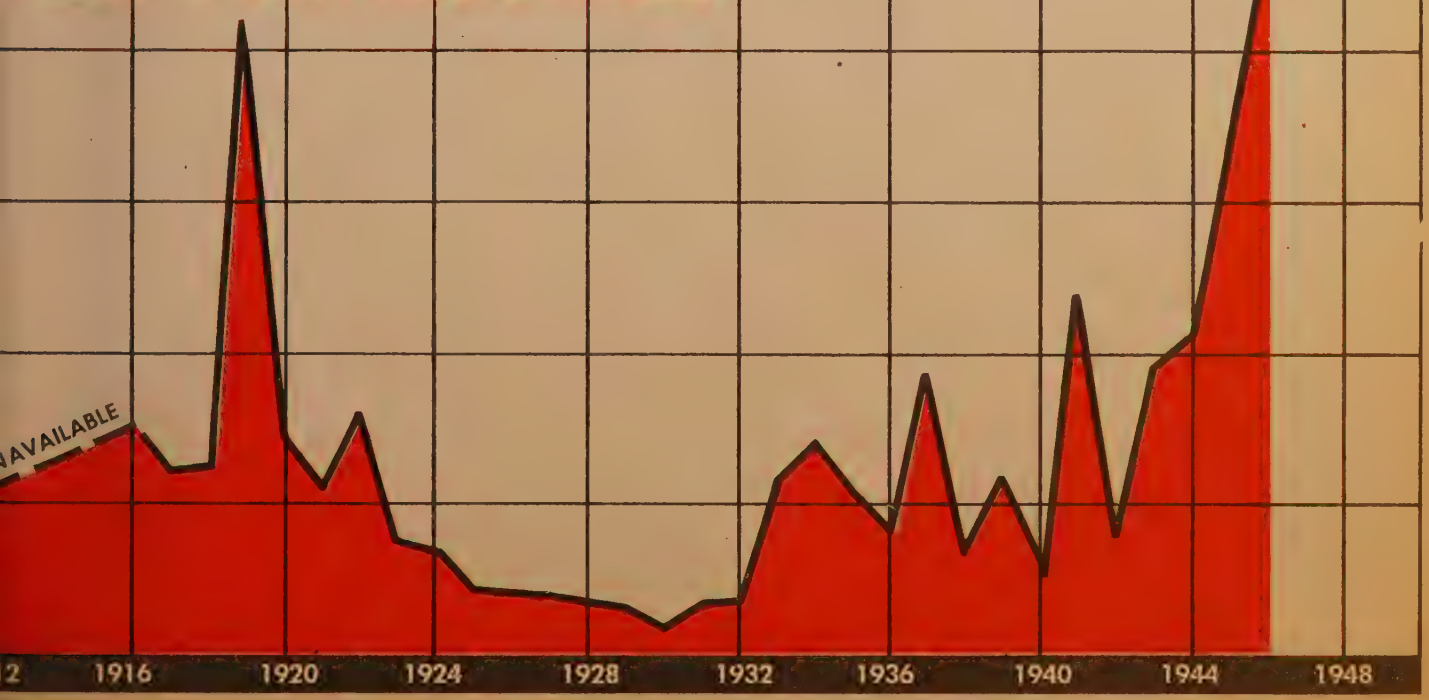


GROWTH OF UNIONS AND CHRONOLOGY OF LABOR LAWS



SOURCE — BUREAU OF LABOR STATISTICS

WORKERS INVOLVED IN STRIKES



VARIATIONS OF THE CLOSED SHOP

CLOSED SHOP

In a closed shop agreement all workers must be members of the union when they are hired. In addition, they must remain union members in good standing as long as the agreement lasts. The union generally supplies new workers for the company with the closed shop agreement.

UNION SHOP

In a union shop agreement the employer may hire any workers he desires, but these new workers must become union members within a specified probationary period—generally 60 to 90 days. All employes must remain union members in good standing as long as the agreement exists.

MAINTENANCE OF MEMBERSHIP

This form of agreement received great impetus during the war when the National War Labor Board forced it on many employers. Under this arrangement, employes who are union members when the agreement is signed, or who later become union members, must remain members in good standing as long as the agreement lasts. There is often an escape provision permitting employes to withdraw from the union within a specified time after the agreement is signed.

on the closed shop in Britain. There, however, it is almost impossible to even guess at the number, as British trade union agreements are private agreements between employers and workers' representatives, not legally recognized and unenforceable in a court of law. There is no publicity about the details of a union agreement and a closed shop understanding can more often than not be simply a word of mouth agreement, but no less scrupulously adhered to although not put in writing. For, as pointed out by the Commission sent to Britain by the late President in 1938, over there "provisions of collective agreement rest upon moral force rather than upon legal compulsion...the attitude of both groups (i.e. management and labor) is that legal sanctions for these are undesirable and hence the agreements should rest upon mutual understanding and good faith."

Experience of Veterans

Apart from the boldness of trade unions in insisting on the closed shop another factor that has focussed public attention, both in Britain and here, on its implications is the experience of returning veterans trying to reestablish themselves in civil life. Instance after instance crops up of a veteran wishing to enter an industry, operating under a closed shop arrangement, being told that to do so he must join the union. When the veteran tries to join the union, his application is rejected without the union having to give account for its action. Thereby goes the veteran's hope of earning a livelihood according to his free choice.

Therein lies the strongest moral weapon that opponents of the closed shop use against it. It gives to a body— the trade union—that is not responsible to the community, as is a legislature, whether Congress, Parliament or State Assembly, power to form its own rules which may deprive a person of his livelihood. Such a power, practically of life and death, should, it is claimed, not be in the possession of an irresponsible body. Only the state, it is claimed, should be able to set a limit to human freedom and be able, as someone described it, "to deprive a person of the fundamental democratic right to live by no man's leave under the law."

Apologists for the principle of the closed shop are fond of pointing out that the power to exclude a person from the opportunity to earn a livelihood is freely exercised in other walks of life such as by lawyers through bar associations or by doctors through medical societies. Where the analogy falls down, opponents of the closed shop point out, is that the rules which govern the admission or exclusion to the medical or law professions are derived from legislative authority responsible to the community at large, and not, as in the case of a trade union, responsible only to its own conscience. The rules governing entrance into the professions are aimed strictly for the public protection through the maintainance of ethics and proficiency. Such can not always be said of closed shop rules.

Having discussed the above broad principle involved in the problem of the closed shop let us examine some of the minor arguments for and against it. One of the most commonly brought forward in its favor by union leaders is that it is unfair for non-union workers to benefit from the efforts of collective bargaining when they have done nothing to defray the expenses involved in securing the advantages derived.

That there is some plausibility to such an argument is often conceded by opponents of the closed shop, but the difficulty is of assessing what part of the activities of the union can be properly charged to improving the position of the worker and what part, as in the case of the English trade unions, to supporting the ideologies of a political party, with which the non-socialistic worker may not be in sympathy. The incursion of trade unions into politics is regarded in some quarters as one of the strongest arguments against the closed shop, as, in addition to depriving the worker of his economic liberty, it shackles him politically.

There are some who even claim that non-union workers are not necessarily beneficiaries of union collective bargains and that asking them to contribute to the expense involved in securing them is begging the question. They point especially to the experience of British workers. In a closed shop there it is almost the universal practice to try to prevent overtime even at extra rates. The non-union worker who would wish to add to his earnings is certainly not the beneficiary of collective bargaining in this case.

Similarly workers who are the victims of lost markets, such as the coal miners of this country and Britain, through the ability of

closed shop agreements to enforce uneconomic demands, are not, on the surface, beneficiaries of collective bargaining. The strikes of the 1920's in Britain permanently deprived about a third of the British miners of their livelihood through loss of markets to competing sources.

Security Often a Myth

The fact that the closed shop makes the position of the trade union more secure in an industry is a factor that sometimes works against the members themselves. It often leads to complacency on the part of the leaders who are no longer in need of selling the advantage of union membership by efforts on behalf of the workers. There have even been cases of collusion between employers and corrupt trade union officials, once the closed shop became an accomplished fact.

Opinion is more divided on the question as to whether management benefits by the closed shop than on whether the workers do. In a sample survey made by the National Industrial Conference Board of companies operating a closed shop a little more than a third reported satisfaction with the arrangement, a little less than a third definitely disapproved of the arrangement and the rest believed the advantages balanced by the disadvantages.

Among the advantages claimed were that the closed shop eliminated litigation, strife and government interference; placed the union in a better position to keep its agreements, eliminated coercion of employes to join and gave the employer the help of international union officers, if necessary.

That the above view that a closed shop eliminates strife is a trifle on the optimistic side seems proved by the case of the United Mine Workers, whose union is the nearest example, in this country, of the completely national closed shop in an industry. Not only does the closed shop not avoid strife in the industry once the contract has run out, but it does not prevent strife during its term. In 1945 there were 598 work stoppages in the bituminous industry, involving 581,500 workers and resulting in 5 million idle man days at a cost of $50 million.

Among the disadvantages to management is cited the fact that the closed shop inevitably tends to multiply restrictive practices that are the death knell of efficient production. The essence of productivity is the willingness of industry, both labor and management, to adopt any means, whether new machinery or new techniques, to produce more goods at less human effort, without having to pay heed to time-worn working conditions. Experience has shown that the closed shop curtails the opportunity of management to improvise means of increasing productivity.

Acme

By going on strike, coal miners in closed shop mines completely paralyze a basic industry.

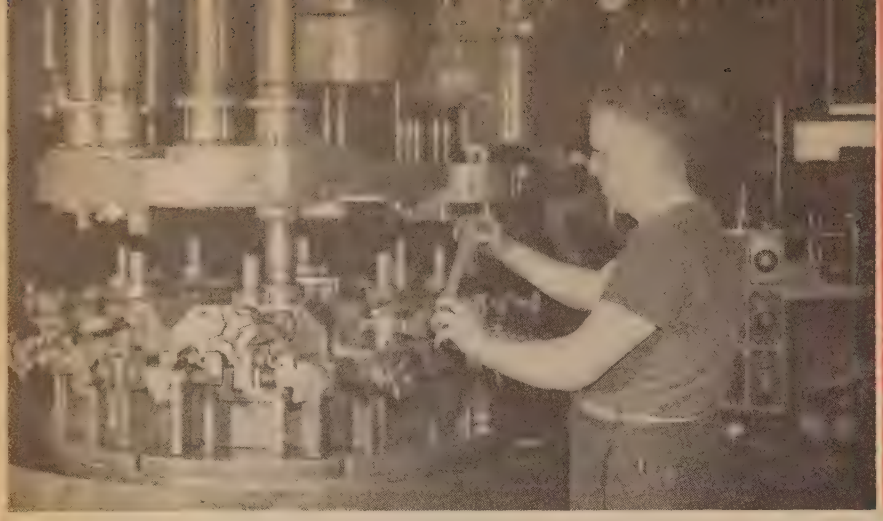
Undermines Discipline

Another place where it is alleged that the closed shop hampers management is in the undermining of discipline. The worker seeks the favor of the union official in his productive efforts rather than the commendation of his employer. There is therefore in a closed shop no incentive for a worker to try to excell at his job as it is safe so long as he maintains the mediocre standard of output pledged by the union in its contract. Furthermore, the standardization of wages and the strict seniority rules in a closed shop are insurmountable obstacles on the incentive to a worker to exert his utmost effort.

As for the position of the community at large in relation to the closed shop, we have already referred to its tendency to curtail the right to earn a livelihood. As to its general effect on the economic position of the community, we cannot better end this article than by quoting from the study of the National Conference Board of the closed shop. Says the report in regard to the public: " . . . the closed shop can not only hamstring the employer in managing his business but also levy tribute on the public."

"It is becoming more generally understood now that it is the customer, not the company that finances wage increases in most instances. If, through union domination, wages and costs are forced up arbitrarily to unnecessary and uneconomic levels, it will be the public that must either pay the excessive prices or, by withholding its patronage, eventually put the company out of business. Even if that extreme situation does not develop, the public would pay the price of the rigidities of the closed shop . . . because the savings resulting from the more efficient operation which come from initiative and competition for advancement and which normally would be passed on to the public, in lower prices, would not materialize."

Ford Streamlines



Close-up of a new 32-spindle machine for a variety of turning, drilling, tapping, reaming, and chamfering operations on oil pumps.

BRIEFED—The rearrangement of many thousands of machine tools, ... miles of conveyor lines, scores of furnaces, and multitudinous pieces of related equipment is a tremendous undertaking. This article tells how the Ford Motor Company reorganized their motor building to provide more working space and increased capacity and to reduce manual operations and worker fatigue to a minimum.

MORE working space, greater convenience, less handling, less fatigue for workers, less waste motion, better quality of product, and increased capacity are among the notable results of a major reorganization of the Motor Building which is just being completed at the River Rouge plant of the Ford Motor Co.

This building is 1,200 feet long and has a ground floor area of 788,790 sq ft which is supplemented by storage balconies having a combined area of 57,700 sq ft, making a grand total of 846,490 sq ft. It houses the crankshaft, camshaft, connecting rod, piston, piston pin, transmission gear, oil pump, radiator, and engine assembly departments, together with some minor operations. The cylinder block is machined in another building and is brought to the Motor Building for assembly.

Previously, there had been no extensive reorganization of these facilities for many years. During this time, there had been many changeovers, the Mercury car had been added, many new operations had been introduced, many changes in operations had been made, and much new equipment had been installed. As a result many departments had become over-crowded, the proper sequence of operations had been broken in innumerable places, and there was much handling of materials which could be eliminated by rerouting the flow on the straight-line principle.

To reorganize and rearrange all of these departments, containing many thousands of machine tools, miles of conveyors, scores of furnaces, and related equipment, was a tremendous task, one comparable to that of reconverting many a whole factory. But the management decided that a major operation would be well justified by the results to be obtained, and the job was done.

Departments Rearranged Completely

Most of the departments were completely rearranged. The sequence of operations and the flow of materials were streamlined, much new equipment was added, manual operations were reduced to a minimum, new devices were designed and installed, maintenance operations were facilitated, and even engineering changes were made to improve the procedure.

To release space for expanding other departments, the Ford-Ferguson tractor job was moved to the Highland Park plant.

This job, the 6-cylinder crankshaft and the V-8 crankshaft formerly had been all crowded together, while the main transmission shaft department had been located at one side of the crankshaft department.

The transmission shaft operation was moved about 1500 feet north where it had plenty of room, and the space vacated was taken over by the crankshaft department. Both previously had been so crowded and so ill-arranged that there was "hardly room to turn around in." There had also been much doubling back in the sequence of operations, and conveyers could not be laid out properly because of the arrangements. Much hand trucking had been necessary previously. Now both departments had ample room and could be streamlined accordingly.

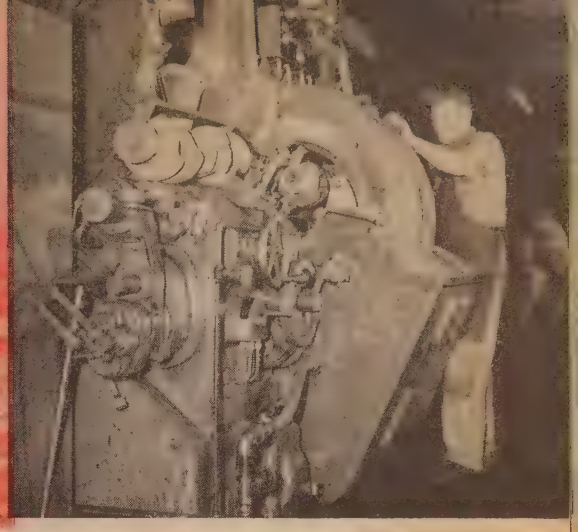
Every machine tool in the transmission shaft department was relocated and about 33 per cent more machines were added. Conveyors were installed to take the stock through the green end in straight-line sequence of operations, thence to the heat treat and on through the hard end, without once touching the floor. Where finished parts formerly were hauled in hand trucks from final inspection to motor assembly, they now are stacked on pallets and handled by Mercury tractors.

Crankshaft Department

The crankshaft department was expanded, the 6-cylinder and the V-8 jobs were separated, all machines were relocated, the old conveyors were entirely dismantled and replaced by new ones, and many new automatic machine tools were installed in place of single-purpose ones. Among these are 44 automatic crankshaft lathes, each of which does the work formerly done by six single-purpose machines; spot-grind center bearings, turn OD of

Operations In Motor Building

By D. G. Baird
Detroit Editor



This new center-drive lathe performs six machining operations on the crankshaft; 20 new machines replace 55 old.

flange and finish-turn OD of pulley bearing, rough-turn OD of main bearings, turn the flange, turn the gear fit diameter, and cut the pulley bearing to length.

The first conveyor in this department formerly started at the drop test and continued about half way through the department, a distance of some 1600 feet. It had to be operated by two drives and there were entirely too many operations on it. If there was a shortage anywhere or a breakdown, the whole department was tied up.

Now, this conveyor has been replaced by two others, all operations are in proper sequence and the flow is uninterrupted. These two lines carry the crankshafts through the roughing operations. A third carries them through the finish-machining, then many others, none of which is more than 250 feet long, carry them through the washing, preliminary balancing, preliminary drilling, final balancing, final drilling, final check on wigglers, and final inspection. They are then placed on an inter-department conveyor which takes them to engine assembly.

Piston Department

The piston department probably was the most crowded one of all—and the management is particularly proud of the improvements made in it. This department had been expanded internally time after time by installing additional equipment wherever room could be found for it, with the result that there was little semblance of ordered sequence of operations. In an effort to offset this condition, more and more conveyors had been installed, until there actually were too many conveyors, surprising as that may seem. The reason for this was, of course, that the conveyors had to wind about and back and forth to reach the operations. As a further consequence, operators spent much of their time and energy in taking pistons off of the conveyors and putting them back on it again.

Conditions were further confused by the fact that both steel-alloy and aluminum pistons had to be machined on the same lines. The steel-alloy pistons now have been discontinued, but the department still machines pistons for the Ford 6-cylinder and V-8 models and for the Mercury car.

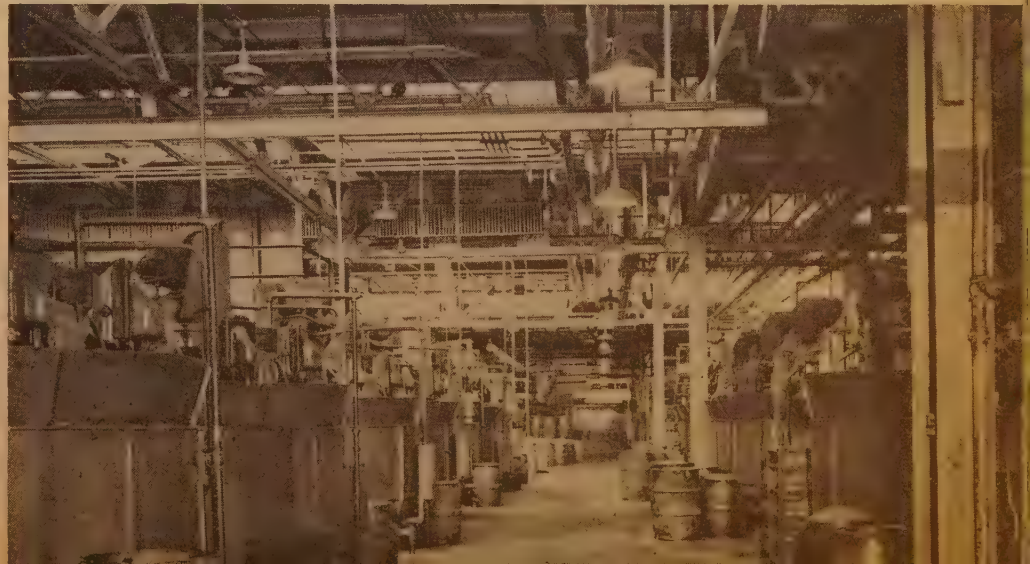
This department formerly was served by 16 monorail conveyors having a combined length of 3,332 feet, and by 11 belt conveyors having a combined length of 6,073 feet. These were dismantled entirely, new production lines were established, every machine in the department was relocated, and fewer and shorter conveyor lines were installed to serve them. There are now 6 monorail conveyors, having a combined length of 1,506 feet, and 11 belt conveyors, having a combined length of 1,130 feet. in this department.

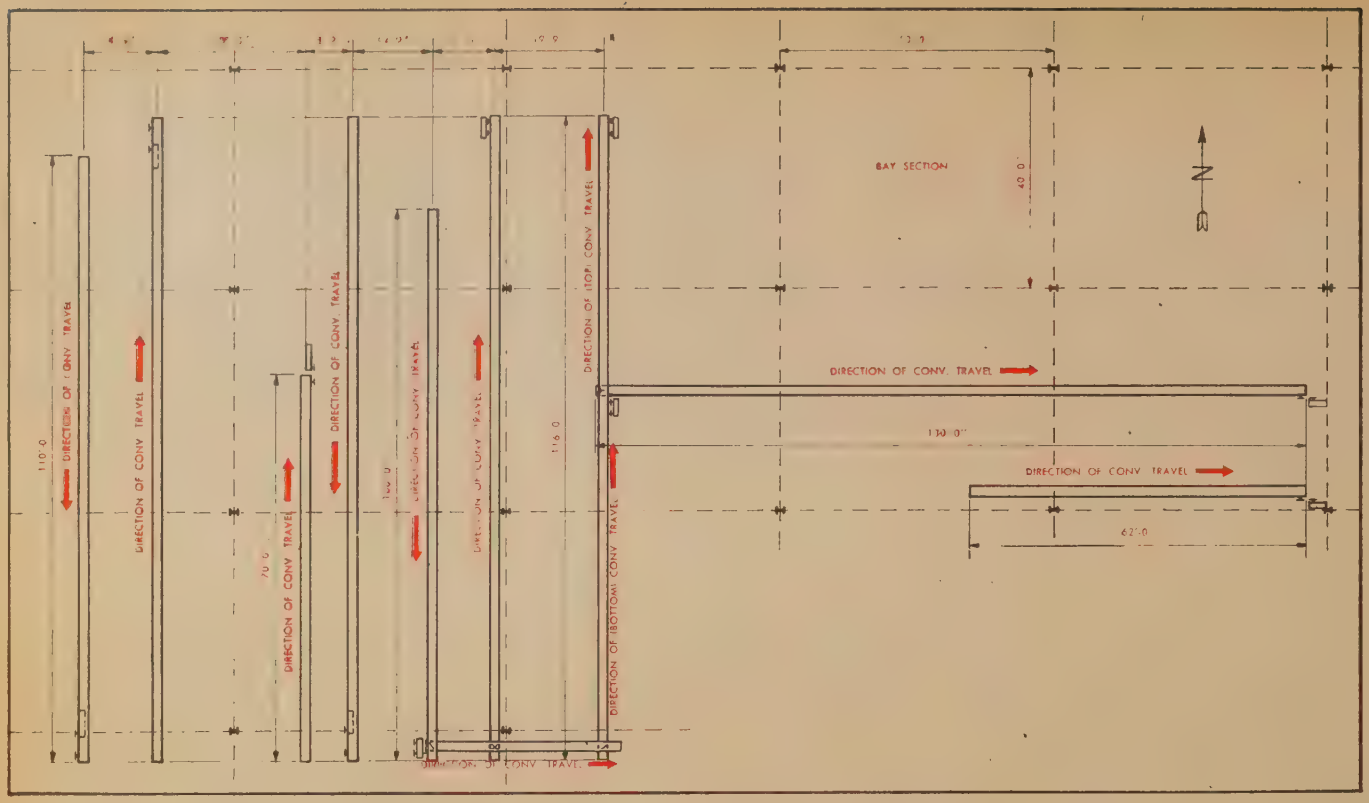
The department has not been enlarged at all and no new machine tool equipment has been added, yet this rearrangement has increased the capacity by an estimated 30 per cent, quality of product has been improved and working conditions have been bettered immeasurably.

Eight Parallel Production Lines

As now laid out, there are eight parallel production lines right straight across the wider end of this department. Serving these lines are seven belt conveyors and three short monorail conveyors, the latter having a combined length of only about 900 feet. Each of the belt conveyors is 16 inches wide and two of them are double-deck ones. All of them are unloaded auto-

These two rows of hobbing machines in the transmission gear department show the large aisles providing easy access for repair or removal.





Piston Department—This rearrangement has increased capacity 30 per cent. Eleven belt conveyors and six monorail conveyors serve the department. Eight parallel production lines run straight across the wider end of the department.

matically by means of gates and guide bars at the work stations and transfer points, except where the transfer is to a monorail conveyor. When an operator needs stock, he merely opens a little gate and sets a guide bar to switch pistons off at his station; when he has enough stock, he removes the guide bar and shuts the gate, whereupon other pistons proceed on the belt until they arrive at the next station where stock is needed, and so on. Many of the machines unload automatically onto the belts.

Old type castle head nut and cotter pin have been replaced with new self-locking nuts pulled to 50-lb. torque.

Some of them also load automatically.

There is also a chip drag conveyor under the floor along the second operation, which is that of turning the OD and dome and rough-and-finish-turning the ring grooves. Chips from this operation formerly were trucked. There is no need of a chip conveyor elsewhere in the department.

On leaving the eighth operation, pistons are switched onto another double-deck belt conveyor which runs at right angles to the seven parallel ones already described. This conveyor takes them along between two long lines of grinders. They are then handled by both monorail and belt conveyors through several other operations, including automatic plating, and finally are cooled on belt conveyors in an enclosed cooling room.

The Coolant System

Another outstanding improvement in this department has been made in the coolant system. In the former system the coolant trenches were level and had flat bottoms, thus permitting the soda water, which is used, to stand and collect dirt and sediment. Filter bags were used on the machines—as many as ten of them on the big, five-wheel grinders—and these had to be changed frequently. All in all, this department was using about 2,500 such bags each week; and the filters cost about 20 cents each.

A central filtering system has now been installed in the coolant reservoir and the coolant trenches have been replaced by others which have rounded bottoms and which are set at a grade of ⅛-inch per foot to prevent the coolant from standing in them. Filter bags have thus been eliminated entirely and the quality of product has been improved by using a coolant which contains no sediment or other impurities.

In reorganizing the transmission gear department, approximately 1100 machines were moved and relocated and 10,000 sq ft of floor space was allotted to it, making the total floor area of this department 98,575 sq ft. During the war, many of these machines had been crowded to one side and all of the conveyors had been torn out. When the department was reconverted, 7,860 feet of conveyors were installed, and at the time this was written, another 2,203 feet of conveyor still were to be installed.

New, Modern Machines

Much of the machine tool equipment was replaced by new machines of most modern type. Among these

are seven new hobbers, 25 new automatics, 25 new gear shapers, 41 new gear cutters, and 21 new grinders. In every case, the new machines are superior to the ones which they replaced, to say nothing of the time and cost which would have been involved in overhauling the old ones. Some of the new machines are also larger than the old ones. The new Bullards, for example, are 8″ – 8-spindle ones, whereas the ones which they replaced were 6″ – 6-spindle ones.

And speaking of big machines brings up another major improvement which, while simple in a way, is very important. Under the former crowded conditions, many of the big machines, including some of the huge, 8-station hobbers, were surrounded on all sides by other machines with the result that when it became necessary to pull out one of them for repair or for other reason, many other machines had to be pulled before the one wanted could be removed from the line. These big machines now are located where access to them is easy —usually on an aisle, where any one of them can be pulled without disturbing the others.

New Hardening Method

Another important change in this department is in the method of hardening ring gears. These formerly were trucked to vertical, gas-fired hardening furnaces, dipped in acid, loaded in the magazine in the furnace, hardened for about 30 minutes, then they were taken out, quenched, hung on a conveyor and taken to a draw furnace, then trucked back to the job.

These furnaces now have been replaced by two 50-kw electronic heaters, each of which hardens a ring gear in 18 seconds and quenches it automatically in another four seconds, and the ring gear doesn't have to be drawn at all. Each heater is equipped with a table in which are two fixtures. The operator positions a ring gear in one fixture and presses a button, then positions another ring gear in the other fixture.

Meanwhile, the first gear has been heated and quenched and is ready to be taken out and replaced by another. The ring gears are still hot after quenching and this remaining heat is used in installing them on the flywheels.

Oil Pump Section

In the oil pump section, which is a part of this department, several machine tools of automatic or mul-

New belt conveyor line takes pistons through the semi-rough grinding machines automatically. Note absence of operator.

Here the pistons are traveling on belt conveyors from the boring machines to the next grinding operations.

This section of new belt conveyor line for pistons carries them from the semi-rough grinders to boring machines.

Five lines of pistons converge into one line which carries the pistons to the finish grinders.

Induction heat treat unit for starter ring gear.

Close-up of gear before lowering to final position.

tiple-spindle type have replaced single-purpose ones. Among these are four 10-spindle drill presses which are used for centering, drilling and reaming operations on the oil pump body; two machines which do a variety of turning, drilling, tapping, reaming, and chamfering operations (one of these has 14 spindles, the other has 32); two 4-spindle boring mills which bore two pump bodies at once; two external grinders which automatically grind two at a time, and three automatics each of which automatically performs five operations at a time.

The piston pin department was also completely rearranged and the flow of material rerouted. Piston pins formerly were rough-machined, sent to heat treat, then returned to the same area for finish-machining. Now the flow is straightforward and continuous. New furnaces have also been installed, but these are of conventional, gas-fired type. Several new machine tools have been installed, and two special chamfer grinders have replaced three of conventional type.

Manual Handling Eliminated

The radiator department had not been changed at the time this was written, but plans for doing so had been completed and the department will be completely rearranged soon.

All manual handling is to be eliminated and many notable improvements in equipment and procedure are to be made. All overhead conveyors are to be torn out and replaced by others which will bring the parts to the work level. About 2,000 feet of conveyor will be added to the present 2,000 feet.

Where soldering is now done in five lines and passed manually from one to another, a "merry-go-round" conveyor is to be installed. A new, double-swivel-type fixture has been developed and 47 of these will be mounted on the conveyor. One of the swivels permits turning the fixture vertically through a complete circle, while the other permits turning the work horizontally through a complete circle, thus making it possible to position the work most conveniently for any and every operation. The speed of the conveyor is variable, the range being from about six feet a minute to 30 feet a minute, and the division of labor can be controlled to suit any desired production schedule.

Radiator cores, fins, tubes and supplies, which are now handled manually, will be placed in a special carrier, suspended from a monorail conveyor, and taken to the assembly line. Cores will be taken by the same conveyor to a new, continuous-type baking oven which is to replace four existing ones of conventional type.

Cores at present are placed manually in a carrier and shoved into the furnace, one at a time, then taken out the same way. The new furnace will be traversed by a conveyor on which will be 27 fixtures to carry as many cores at one time. The same conveyor will then carry them through the cooling system. The new furnace will have a capacity more than double that of the four old ones which it will replace.

Headers which are now soldered to the core manually will be soldered automatically.

Lamp tunnels which are now used for drying cores will be replaced by a gas-fired furnace.

Comparatively few changes were made in the camshaft and connecting rod departments.

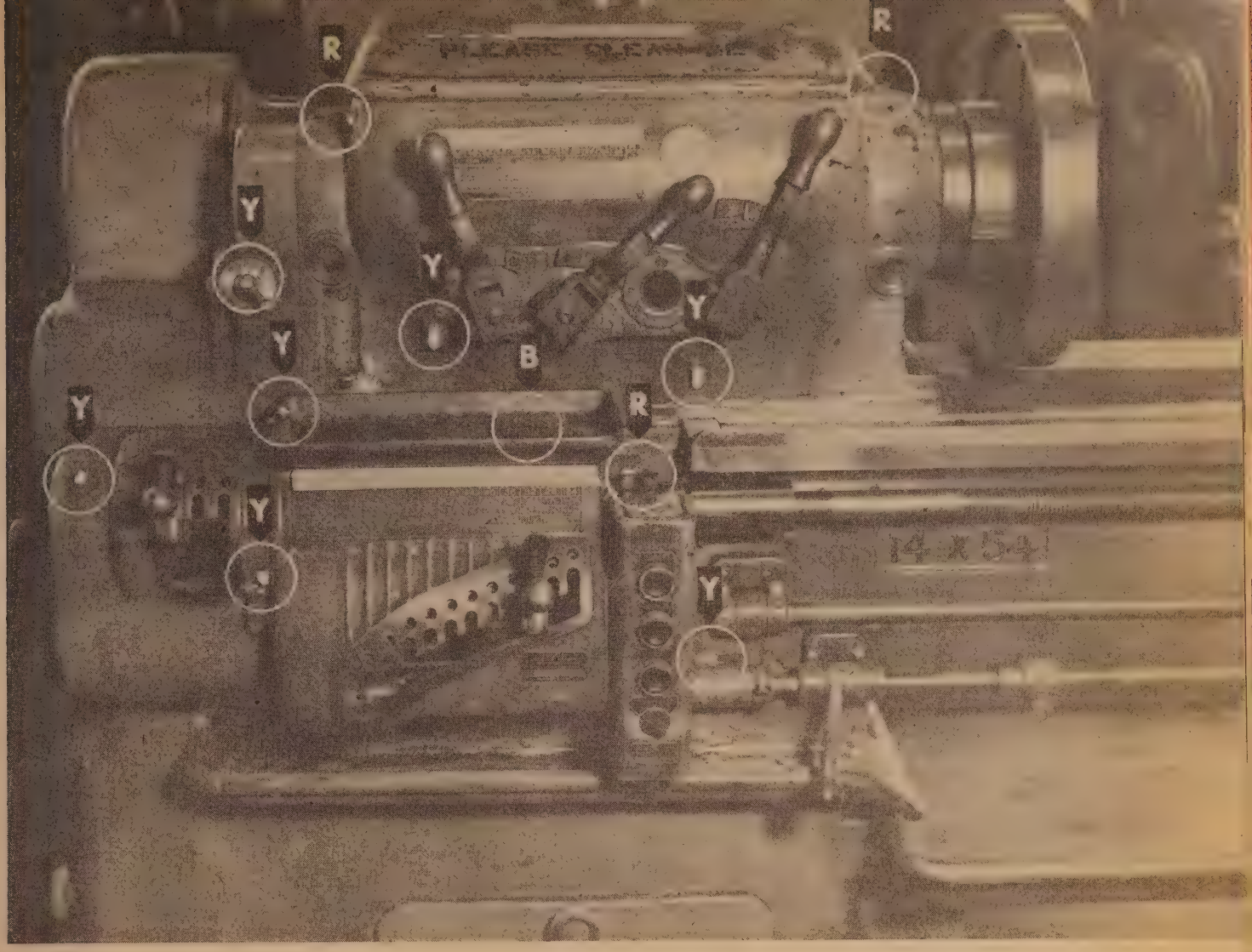
Engine Assembly Department

In the engine assembly department, the three final assembly lines, each 290 feet long at present, are to be extended 85 feet. This will provide more room for the workers at each work station, will contribute to the quality of workmanship, and will increase capacity considerably.

Several automatic machine tools are also to be installed. At present, six indexing machines are used for grinding valve seats and arbors must be fitted by hand; these are to be replaced by four machines of the same make which will be fitted with self-contained arbors. The present machines grind eight valve seats at a time, then index and grind the other eight; the new ones will grind all 16 seats at the same time, besides eliminating much manual work.

Six machines which are now used for boring the main bearings, three which are used for broaching the cam bearings, and three which are used for reaming the dowel holes are to be replaced by five Ingersoll automatics which will do all of these operations and will also finish-bore the oil seal pocket. These five automatic machines will have a greater total capacity than that of all the machines which they will replace.

Further to improve working operations and to improve quality, while at the same time contributing to an increase in capacity, numerous engineering changes have been made. Most of these are minor ones, but taken all together, they contribute a great deal to the program. Cotter keys, for example, are being replaced in some instances with self-locking nuts, while studs and nuts in the cylinder head are being replaced with bolts.



Color Code for Machine Lubrication:—

Y—yellow: DTE Light
B—blue: DTE Heavy Medium
R—red: Universal Spindle Oil

Color Code Aids Small Plant Maintenance

by H. H. Hoffnagle

Fort Edward (N. Y.) Plant
General Electric Company

BRIEFED—The adoption of sound preventive maintenance practices helped considerably to operate this small plant without a serious operational breakdown during four years of peak production. One important feature was the machine oiling routine which was made easy by circling oil and grease fittings with the color assigned to each particular grade of lubricant.

PREVENTIVE maintenance, exemplified by a specialized color code system to facilitate the oiling schedule of plant equipment, was largely responsible for keeping the Fort Edward Plant of the General Electric Company operating without a serious operational breakdown during four years of peak war production. The plant employs about 750 persons.

Engaged in the manufacture of specialized small motors for vital war needs, the interrupted production of which might well have serious consequences, preventive maintenance was carried to the extent that several hours' time each week of most of the specialized tradesmen on the maintenance force were spent in merely looking for possible sources of trouble and finding remedies for them.

For example, the oiling routine was the full-time job of one person, who specialized in oiling and belt lacing. About 80 per cent of his time, however, was consumed in oiling the various machines, blowers, ventilating fans, etc., to insure against failure because of faulty lubrication.

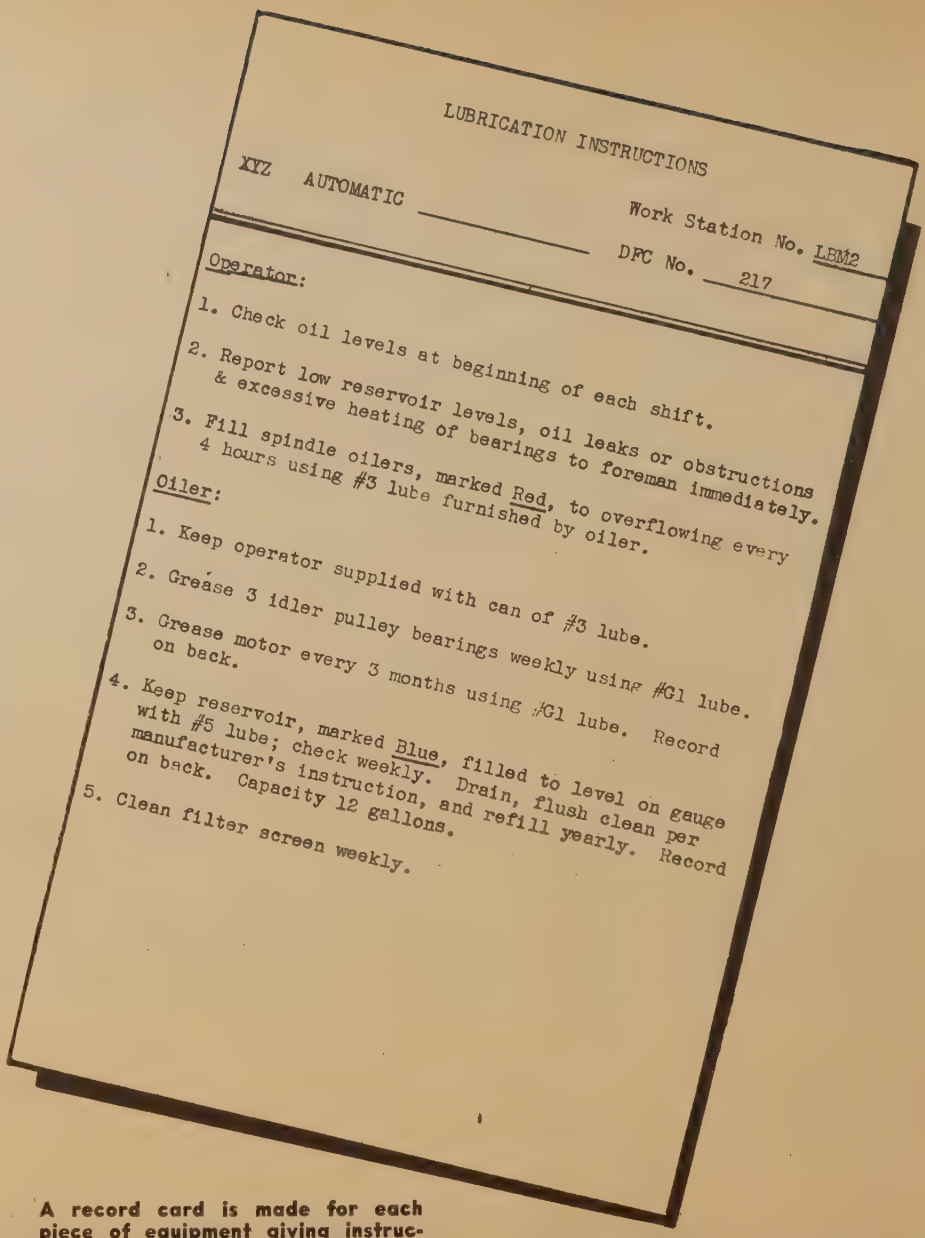
To make sure that this work was being done regularly and properly, as well as to facilitate the training of new individuals and provide a record system so that other supervisory personnel could be kept informed of the stage of the work, a color-identification system of equipment was devised.

All grease and oil requirements of each machine were analyzed, with the assistance of the manufacturer and representative of one of the leading lubrication manufacturers. From this analysis, a list was made out that assigned each fitting, on any piece of equipment which required a special grade of lubricant, a special color.

It first appeared that fifteen or eighteen types of oils and greases would be required, but by experimentation and laboratory analysis it was discovered that many of them were basically similar enough so that six grades of oil and three of grease would satisfy all requirements. Having done this, it was a simple matter to go through the factory and circle the fittings on the machines with the color assigned to the particular grade of oil or grease required.

Lubrication Record Card

With the color code established, a record card five by eight inches in size was made up for each piece of equipment and was enclosed in a removable cellophane covering. The front of the card explained in detail the frequency with which the various parts required oiling and the amounts of oil needed. The back of the card was printed to provide space in which the oiler could indicate the date and initial it after the necessary work was performed. A summary sheet of these cards, maintained in the foreman's office, listed those pieces of equipment which required attention daily, weekly, and monthly.



LUBRICATION INSTRUCTIONS

XYZ AUTOMATIC — Work Station No. LBM2

DFC No. 217

Operator:

1. Check oil levels at beginning of each shift.
2. Report low reservoir levels, oil leaks or obstructions & excessive heating of bearings to foreman immediately.
3. Fill spindle oilers, marked Red, to overflowing every 4 hours using #3 lube furnished by oiler.

Oiler:

1. Keep operator supplied with can of #3 lube.
2. Grease 3 idler pulley bearings weekly using #Gl lube.
3. Grease motor every 3 months using #Gl lube. Record on back.
4. Keep reservoir, marked Blue, filled to level on gauge with #5 lube; check weekly. Drain, flush clean per manufacturer's instruction, and refill yearly. Record on back. Capacity 12 gallons.
5. Clean filter screen weekly.

A record card is made for each piece of equipment giving instructions and schedules on the front and listing work performed on the back.

Consequently, working from this summary sheet, the oiler knew each day where his services were required. Furthermore, with the list posted in the office and the date and initials of the oiler on the back of each record card, the foreman or supervisor could tell at a glance whether or not a piece of equipment had been lubricated.

A month's time was required for the Planning Department to gather the data, have the cards set up, and supervise marking the machines. The efficiency of the system was soon shown, because the plant had been operating for about a year

• Continued on page 182

General view of the maintenance tool room.

BRIEFED: Described here is a case history of a job evaluation system being installed in the clerical department of a company whose plans call for extension of the system to all manufacturing departments of the mill. After attending school to study job evaluation the management and union representatives of the job evaluation committee worked out the plan explained here.

Company-Union Committee Works Out Job Evaluation Program

By Francis Westbrook, Jr.

Alexander Smith & Sons Carpet Co., Yonkers, N. Y., rug and carpet manufacturer, presents a practical case history of a company in the process of installing a job evaluation system as part of a broad, long-range plan to meet the problems growing out of current labor-management trends.

Harold C. Zulauf, vice-president in charge of industrial relations, believes that the solution to these problems must be found in the answer to the question: Where is the money coming from to pay for such basic needs as social benefits, better working conditions, higher wages, and dividends for stockholders? The answer, he contends, lies in greater production per worker. While overall unit output has increased due to the efficiency of machinery, he doubts that man's production has been stepped up at all in recent years. It may even have dropped. Probably the only way that the productivity of the average employe can be increased, he stated, is through job evaluation and improvement of the piece work and incentive systems. Because incentive systems cannot work efficiently until every employe knows the exact scope of his job and is satisfied that he is being fairly paid according to his duties, job description and evaluation must be the first step. Further, Zulauf is convinced that such a plan can only be accomplished in close cooperation with union leaders.

With this basic philosophy established, the industrial relations department of Alexander Smith & Sons last summer began formulation of a job evaluation plan suitable to a carpet mill. The clerical department, with 159 different jobs and about 270 employes, was selected for a case study. Prior to this there had been no definite yardstick for measuring the relative value of jobs. Such factors as personal judgment, precedent, slight comparison with other jobs, and supply and demand had been used in setting rates. Neither had any of the jobs in the clerical department been accurately described, an omission which frequently led to confusion and disatisfaction.

Members of job evaluation committee include, left to right: Florence Houston, time study engineer and Frank Saidis, junior industrial engineer, both representing management; Carmen Rose, a chief shop steward and president of the company's local of the Clerical Workers Union, CIO, and George Keppler, also a chief shop steward.

INDEX OF JOB EVALUATION FACTORS

Sheet No.	Factors	Point Range	%
1.	Knowledge	5 - 40	8
2.	Experience & Learning Time	1 - 60	12
3.	Initiative	5 - 50	10
4.	Judgment	5 - 75	15
5.	Monetary Responsibility	2 - 50	10
6.	Leadership	0 - 40	8
7.	Responsibility For Company Operations	5 - 50	10
8.	Special Personal Requirements	5 - 50	10
9.	Effort	2 - 25	5
10.	Motor Skill	5 - 35	7
11.	Working Conditions	1 - 25	5
	Total	36- 500	100%

Fig. 1. Index of Job Evaluation Factors

Evaluation Work Begins

The task of formulating an evaluation plan was assigned to Frank Saidis, junior industrial engineer, and Florence Houston, time study engineer, both of the industrial engineering department. First they went to school to study job evaluation and the various plans in current use. Their next step was to check the classification, point, job ranking, and factor comparison systems against the specific needs of their company.

The job ranking and classification plans were judged too unscientific in their approach. While factor comparison and the point system met this objection, the former was believed too complicated to be successfully explained to employes. Management was convinced that full understanding and cooperation of its workers was essential to success. Therefore, the point system was chosen as the simplest and most likely of the four to succeed.

In the selection and weighting of job factors that covered all 159 clerical jobs in the main office and in the various manufacturing departments of the mill, management experimented with the description and evaluation of a variety of key or bench mark jobs. This practice, combined with a careful checking and comparison of all jobs, finally led to the tentative selection and definition of 11 factors. The factors also were given tentative point ranges.

Believing, at this point, that it had a workable plan, management called a meeting to present it to union representatives, Carmen Rose, a chief shop steward and president of the Alexander Smith local of the Clerical Workers Union, CIO, and George Keppler, another shop steward. They liked the plan, but to understand it better, worked out some more key jobs and went to school to study evaluation. When thoroughly familiar with the plan and the subject in general, they met with Saidis and Miss Houston as a committee to study the 11 factors and their weighting. A number of changes were made.

Union Employes Only

At the union's suggestion, for example, it was decided that the plan

should apply only to union employes, excluding supervisory personnel as originally intended. Further, the designation of the factor of *education* was changed to *knowledge*. It originally had been measured in terms of formal education and its equivalent, but, largely on the recommendation of the union representatives, it was decided to get away from formal education and to express this factor in terms of mental level or capacity for the specific job. The point ranges of some of the factors also were modified.

The ultimate factors and their definitions, as worked out by this committe of labor and management, were:

1. Knowledge—The level of mental training required by a job, however acquired.

2. Experience and Learning Time —The total time on the job and prior thereto, necessary for an average person having the required knowledge to satisfactorily perform the job.

3. Initiative — The independent action required to work or proceed without direction or supervision.

4. Judgment—The demand for meeting situations; the degree to which the job requires reaching a correct decision by the analysis and proper evaluation of the factors entering into a given situation.

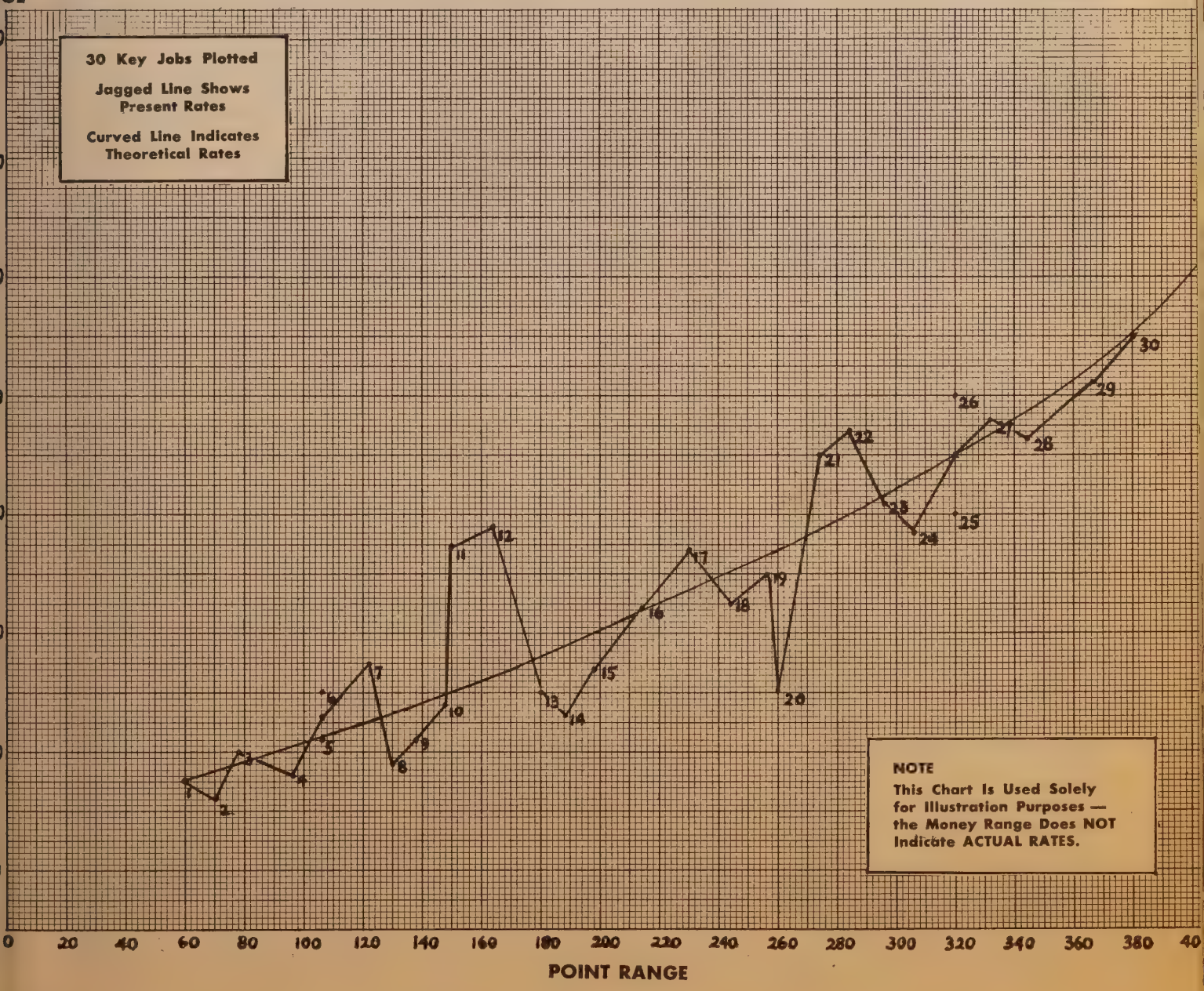
5. Monetary Responsibility—The maximum possible loss to the company which could be incurred by any single error, expressed in monetary value.

6. Leadership—The degree of responsibility for the leadership and training of employes. (A) Training of others. This involves the training or breaking in of employes as to the duties of the job. (B) Distribution of work. Positions receive credit for this factor when they involve leadership, distributing work to others, and answering routine questions concerning work, irrespective of whether they involve any responsibility for supervision, training, or hiring and/or suspending others.

7. Responsibility for Company Operations—The control and safeguard of company facilities, procedure, or any work of a confidential nature.

8. Special Personal Requirements—The ability to get along with people, the characteristics necessary for proper contacts within the company, with customers, and with the general public (poise, tact, self-expression, cooperativeness, fairness, personality, etc.). This factor

Fig. 2. Scatter Chart — Points Vs. Money


30 Key Jobs Plotted
Jagged Line Shows Present Rates
Curved Line Indicates Theoretical Rates
NOTE
This Chart Is Used Solely for Illustration Purposes — the Money Range Does NOT Indicate ACTUAL RATES.
0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300 320 340 360 380 40
POINT RANGE

pertains to special characteristics above what is required of the average employe.

9. Effort—The degree and continuity of mental and/or application required by the job. By mental effort is meant the amount of concentration required because of the nature and complexity of the work. This factor should not be confused with motor skill, which measures coordination of the senses to perform the job.

10. Motor Skill — The quickness and deftness required in the coordination of the eyes, fingers, or other senses with the muscles to perform the job, such as for stenography, typing, filing, operating calculating, bookkeeping, billing, addressograph, or teletype machines; operating switchboards, sorting mail, paying off, etc.

11. Working Conditions — Those conditions having to do with the surroundings or physical conditions under which the job must be performed, over which the employe has no control, thereby making some jobs less agreeable than others, such as noise, monotony, dust, working with chemicals that may stain skin or clothes, possibility of bodily harm; working in factory area or necessitating absences from home for more than brief periods, etc.

Fig. 1 shows the point range and weight given to these 11 factors, which can give a total score ranging from 36 to 500.

30 Key Jobs

These factors agreed upon, the two management and two union representatives sat down to describe and evaluate 30 key jobs, with the specific purpose of grounding themselves in a technique of evaluation and to bring their thinking and viewpoints onto a mutual plane so that further evaluation could proceed smoothly.

All this accomplished, management and labor decided that they had a workable system and agreed to go ahead with evaluation of all the jobs in the clerical department, but not to discuss monetary values until the evaluations were completed, when the entire question of wages would be submitted to collective bargaining. At the same time, Saidis and Miss Houston, representing management, and Rose and Keppler, for labor, were formally appointed as an evaluation committee. The committee members, incidentally, have a total service with the company of 56 years, while their average age is only 33 years.

The first step was to hold a meeting with all supervisors and union stewards of the clerical department to explain the program and to assign them to the task of preparing job descriptions in their respective departments. The supervisors were instructed to take the initiative, but to work in closest cooperation with the stewards. To make their task easier, they were supplied with sample descriptions that could be followed step by step.

After the stewards and supervisors had written and agreed upon their descriptions, an experienced employe in each classification was called upon to read the description, to comment, and to sign it. Thus the reaction of a person actually doing the job was obtained to make sure that the description was clear and fair. While this was in progress, members of the evaluating committee circulated through the various departments, studying all clerical jobs with which they were not already familiar.

Final Evaluation

When the supervisors and stewards finished their descriptions, final evaluation, including re-evaluation of the 30 key jobs, began. The technique evolved at Alexander Smith & Sons runs somewhat as follows:

The four committee members call in the steward and supervisor who prepared the description under consideration, and subject them to a thorough questioning and discussion of the various factors involved in the job to make certain that the description is complete and unprejudiced. The supervisors and stewards must agree on every point. Generally, however, they have reached this agreement before coming to the committee meeting.

One of the chief objects of this discussion is to discover whether the supervisors and stewards have overrated the value of the jobs in their departments. Sometimes, it has been found, they become over-enthusiastic and some of them are good salesmen, human enough characteristics which are not discouraged, but which must be brought to light by a thorough understanding of the jobs in question by the committee.

The factors are weighted and the jobs finally evaluated at these meetings. While the supervisors and stewards are present, the discussion of factor ratings is carried on by the committee members in terms of symbols only understood by them. The ease with which they agree on factor values testifies to the remarkable degree in which their thinking works along a mutual plane. Labor and management members seldom are more than a degree apart, and such differences are quickly resolved by discussion and further questioning of the supervisors and stewards.

All jobs in the clerical department have been described and by the time this paper appears all should be finally evaluated. The results, however, will get a further sifting by the committee to determine whether any of the job ratings are out of line, either through error on the part of the committee or as a result of good salesmanship on the part of the supervisors and stewards who wrote the descriptions.

Plotting Job Ratings

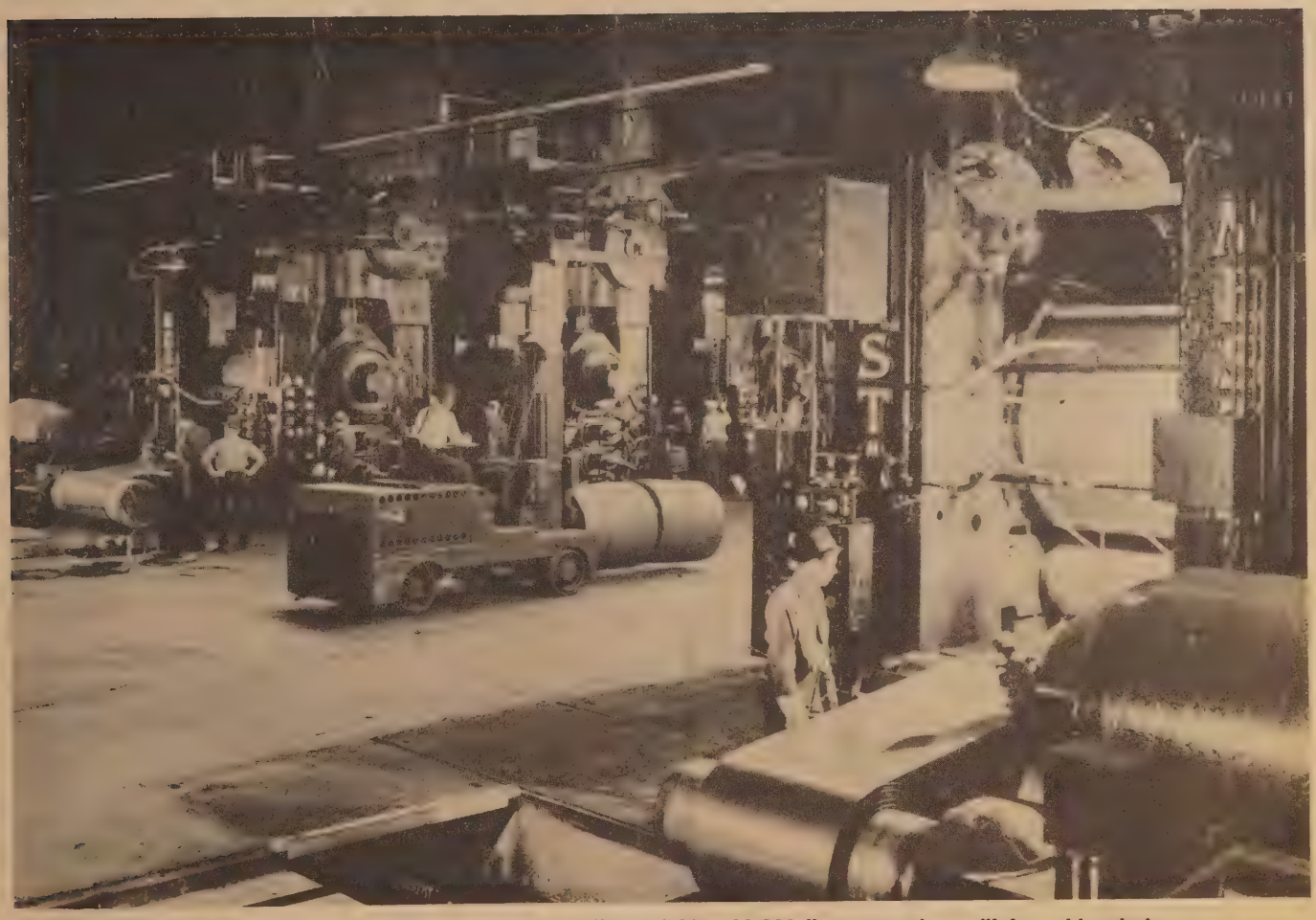
The final step will consist of plotting all the job ratings on a scatter chart, based on their point values and current wages. This line, it is expected, will have a ragged range, as some jobs probably are over or under paid on the present scale. Through the "ragged" line will be drawn a "theoretical compensation line," which will tell the theoretical pay for each job. Fig. 2 is a sample of how this chart is expected to look.

Following collective bargaining on the wage scale to be applied to this point system, the plan will be ready to put in operation. Each employe will receive a copy of the description of his job, and any major changes in a job will call for re-evaluation by the committee, which will continue as an administrative body.

Present plans call for extension of this evaluation system, once it is completed in the clerical department, to the 6000 employes in the manufacturing departments of the mill. Total evaluation will be followed by installation of incentive systems to boost per man production within the capabilities and health requirements of the average employe. Alexander Smith & Sons already has 16 experimental groups working on the incentive basis, and in all cases the result has been increased production and higher average hourly earnings.

Not only does the Alexander Smith management believe that this over-all plan will increase production, thus making more money available for social benefits, higher wages, and dividends, but also that the close cooperation it fosters will go a long way in bridging the gap between labor and management that is becoming one of the chief current industrial relations problems.

Power Trucks Simplify Strip Mill Operations



High-lift, ram truck transports two pickled coils, weighing 22,000 lbs., to tandem mill for cold reducing.

A FLEET of industrial power trucks of various types, sizes and capacities makes possible the orderly flow of operation from production through shipment in the $30,000,000 strip mill of the Jones & Laughlin Steel Corp., Pittsburgh, Pa. Most of the trucks were designed and built for their specific heavy duties, such as lifting, moving and placing huge coils of strip steel, or "flats" of sheet and plate, when the mill commenced operations in 1937. Coils are moved from the rolls to cooling piles, then in succession to the finishing departments, to stock piles or trimmers, again to stock, and finally to loading docks and into box cars.

The trucks augment powerful cranes that shuttle back and forth overhead, but certain of their functions can be handled by the trucks alone in runs of 75 to 200 ft. One operation, that of loading box cars with coils of tin plate gauge, is performed by two industrial power ram trucks. One truck delivers the coils just inside the car's doorway, the other places the coils surely and exactly, in position inside the car. So swiftly do the two trucks perform their respective functions that it is only a matter of minutes before the coils, held in position by wooden bars and chocks nailed to the car's flooring, are ready to be transported to their destination.

Despite the size of the trucks and their heavy loads, most of them are being operated by women at the Jones & Laughlin strip mill. It was discovered during the war that women are efficient in their operation of the trucks and take excellent care of the equipment they are given to handle. All freight car loading is done by male operators.

Since loading of tin plate coils has never been done manually at the mill, no comparison of costs between hand and electric truck loading methods is obtainable, nor are costs readily available for the loading of box cars with pallet loads or "flats" of plate and sheet. However, when the mill first was opened, such loading into box cars was done by a four-man crew which handled a plate or a sheet at a time. These were piled inside the car, then wrapped and banded. It took these four men approximately four hours to load a car in such manner. Now the material is moved in an integral load by an industrial power fork truck of 4000-lbs rating, to the packaging station at the loading dock. After wrapping and banding, the "flats" are moved into and positioned within the box car by the same truck, this work of loading being done by one man, the truck operator, in approximately 45 minutes.

The trucks are operated about 20 out of the day's 24 hours, their only "down time" being for a change of battery (once every eight-hour shift), during the customary lag between shifts, and when they are taken aside for examination once every day.

Preventive maintenance figures prominently in the truck system. Spare batteries, one for every truck in operation, are provided so that a sufficient number is always on hand to provide for changeovers or emergencies.

How to Care for Carbide Mandrels

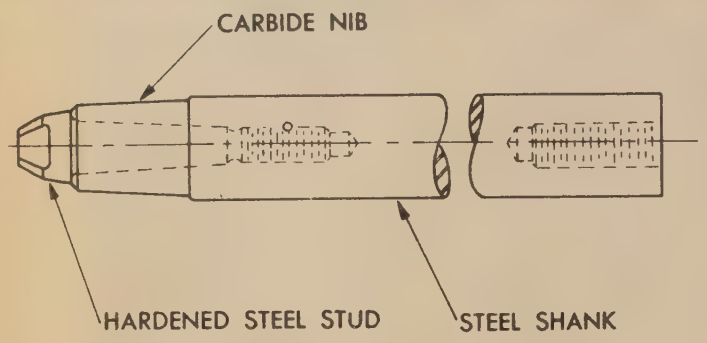


Figure 1

Component parts of this carbide mandrel are (a) the cemented carbide nib which may be either straight or tapered, mounted on (b) a hardened steel stud and drawn up tight to a straight steel shank (c). These mandrels are supplied finished and ready for use in the tube mill; or may be made up by obtaining finish ground, semi-finished, or rough carbide nibs for finishing and assembling as required.

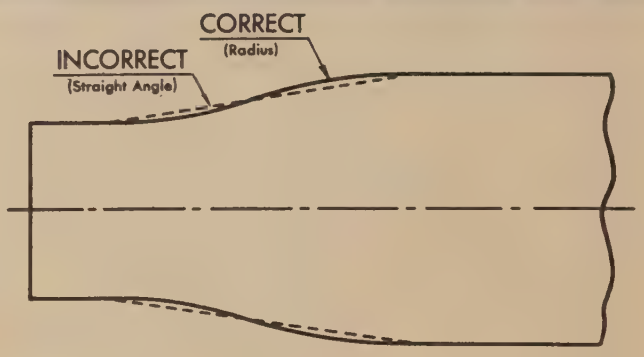


Figure 2

An important factor in carbide mandrel usage is that all tubes should be so pointed that the reduced portion of the tube blends into the larger diameter with a radius rather than an angle. This tends to lessen the shock on the carbide nib and makes for longer life of the equipment. All hot pointed stock should be pickled to remove the abrasive crust of scale formed by heating. The pointed end of the tube should be open. This eliminates formation of air pockets and thus permits a free flow of acid and lubricant over the entire inside surface of the tube.

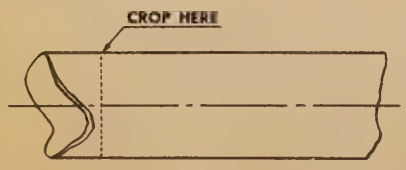


Figure 5

Tubing should always be trimmed regularly. After a tube has been drawn through several passes, the elongation will cause a "scalloped" back end to form on the tube. Quite a bit of stress is set up when such a tube is drawn over the mandrel. Moreover, the mandrel is twisted at the instant the "scalloped" end of the tube leaves the nib. Therefore, if the back end of the tube is regularly trimmed before "scalloping" becomes too pronounced, the life of the carbide mandrel will be materially lengthened.

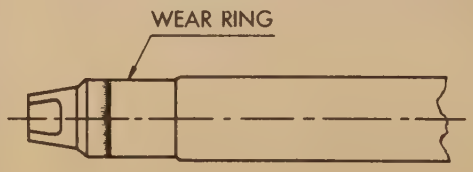


Figure 6

After considerable use, it will be noticed that slight "rings" and wear marks will develop on the carbide nib of the mandrel at the point where the tube reduction starts. If the mandrel is serviced as soon as these wear rings become visible, the rings can be removed by lapping and polishing.

If prompt servicing is neglected, deep wear rings will eventually form in the nib. Such rings tend to remove all lubricant from the tubing. When this happens, the tubing will pick up and scratch. Eventually, small particles of the carbide will pull out, leading finally to complete breakdown of the tool.

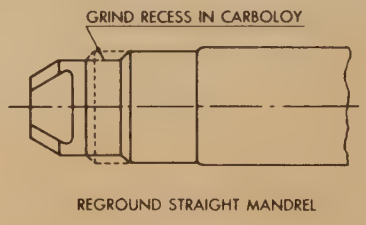


Figure 7

A straight type mandrel which has worn undersize may be salvaged by resetting the mandrel further into the die. Before doing so, however, it is important that a recess be ground into the mandrel nib so as to avoid too great an area of contact with the tube.

Greater efficiency is obtained from mandrels by servicing at predetermined and regular intervals, rather than waiting until the mandrels "appear" to need servicing. Regular servicing gives better tubing, reduces operating costs, and results in longer over-all mandrel life.

THE ever increasing use of carbide dies and mandrels for the production of tubing made from plain, alloy and stainless steels; brass; bronze; aluminum; cupronickel; and aluminum bronze has brought with it a need for a wider understanding of the importance of correctly using and servicing these tools. The following hints on the use and care of carbide mandrels have been compiled in the interest of increasing mandrel service life, obtaining better inside finish on tubing, maintaining closer tolerances on long runs, providing more continuous operation, and decreasing rejections.

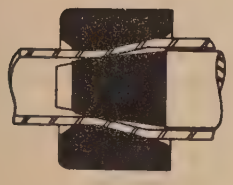


Figure 3

When setting a tapered mandrel, adjust it just far enough into the die to produce the correct size. The setup should be checked to make sure that the tubing does not start to reduce on the steel shank in back of the carbide nib. If this occurs, wear marks will show after drawing. Ample clearance of the mandrel's point is automatically provided by the taper after the inside diameter of the tubing has been sized. Area of contact is also reduced with tapered mandrels. This helps maintain efficient lubrication.

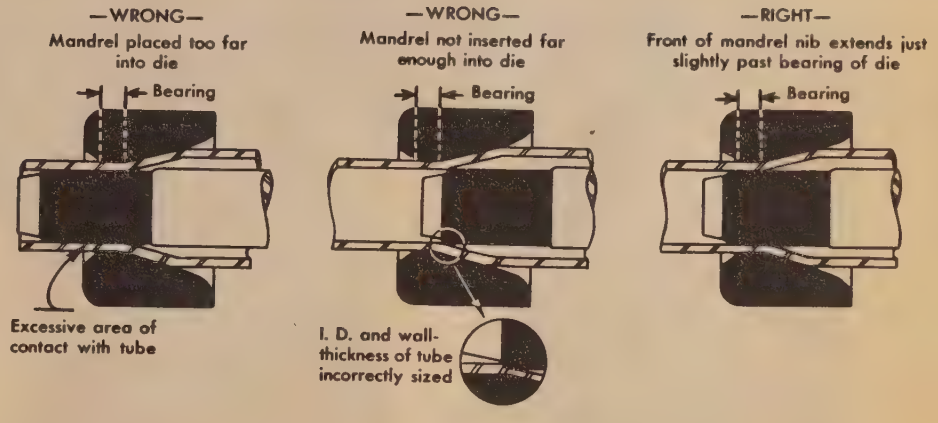

—WRONG—
Mandrel placed too far into die
Bearing
Excessive area of contact with tube
—WRONG—
Mandrel not inserted far enough into die
Bearing
I. D. and wall-thickness of tube incorrectly sized
—RIGHT—
Front of mandrel nib extends just slightly past bearing of die
Bearing

Figure 4

The straight mandrel should be set into the die so that the end of the mandrel's chamfer extends slightly past the bearing. When a straight mandrel has been properly set, its surface will show evidence of contact with the tube at a point from 5/16" to ⅜" away from end of chamfer on the mandrel. If a straight mandrel is extended too far through the die, too much of the mandrel's carbide surface will be in contact with the tube's interior. This condition may cause pickup due to unnecessary friction and strains on the mandrel. However, if the mandrel is not set far enough into the tube, it is virtually impossible to get the tube to start.

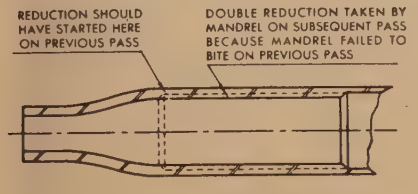

REDUCTION SHOULD HAVE STARTED HERE ON PREVIOUS PASS
DOUBLE REDUCTION TAKEN BY MANDREL ON SUBSEQUENT PASS BECAUSE MANDREL FAILED TO BITE ON PREVIOUS PASS

Figure 8

When drawing steel tubing, a sharp edged chamfer should be maintained on the mandrel's nib front end. If this chamfer becomes rounded over, the mandrel will not immediately "bite" into the tubing as it should. If this happens, no reduction of tubing wall thickness occurs for some 6" to 8" during the first draw. This means that the mandrel must take a double reduction at the start of the next drawing operation. The sudden jerk that occurs when point of normal reduction is reached tends to put excessive strain on the carbide mandrel.

Lubrication

Correct lubrication is extremely important in tube drawing. Improper lubrication results in metal-to-metal contact which creates excessive heat. If allowed to continue, this heat will eventually cause the lubricant to break down. When this happens, the carbide mandrel picks up and starts scratching the tubing. When pickup occurs, the amount of heat generated is frequently enough to turn the mandrel blue. The heat may also cause surface cracks to appear on the carbide nib. Their appearance is usually followed by small particles of carbide falling from the nib and eventually by complete failure of the mandrel.

To lubricate, place back end of tube in lubricant tank first. Gradually submerge entire tube. If done correctly, this expels all air and permits complete coverage of lubricant over interior surface of tube. If pointed end of the tube is closed, cut it off and re-point tube, to provide an opening so the air can escape.

Note: This article is based upon material prepared by A. E. Glen, Carboloy Company, Inc.

Realistic Safety

By John H. Kostmayer

Fitting an employe with safety goggles.

IN less than four years the accident frequency rate at American Viscose has been reduced from 7.3 to 4.0. This accomplishment is largely attributed by corporation executives to effective organization, intensive publicity and widespread competition among employes. Acting as the integrating and motivating factor for the tangible phases of the safety program is the company's underlying philosophy of accident prevention. George T. Eppley, corporation safety engineer, sums it up this way in the booklet, *Safety at A.V.C.* "It is because human life and happiness are of such immeasurable value that we try to make our plant working conditions safe."

Mr. Eppley is in charge of molding his philosophy into a workable and realistic safety program for American Viscose's many plants. For administrative purposes safety engineering is considered a part of the Industrial Relations Department. Each manufacturing unit or plant has its own plant safety council. This group holds monthly meetings and reports regularly to the plant manager. The corporation safety engineer maintains liaison with the council through a safety supervisor in each plant. To carry out the corporation concept of safety as a part of the Industrial Relations Department, the safety supervisor is a member of the personnel department. From a functional point of view, however, his primary task consists of coordinating the planning and the activities of the corporation safety engineer, plant safety council and departmental safety committees.

Much of the work of creating safe thinking, safe conditions and safe practices is carried on by these safety committees. There is a safety committee meeting regularly in each department, usually with a foreman or department head acting as chairman. Members of the committee usually hold office for about six months, thus giving everyone a chance to serve as a committeeman. In this manner general interest in the safety program is stimulated and an influx of new ideas is assured.

The safety division is, of course, a staff or service unit and has as its main function the giving of assistance to line executives to enable them to make the program more effective in their own operating units.

The company magazine, *Crown Rayon News,* is supplementing efforts of the safety division by giving an entire page of each issue to the safety program. An estimate of employe interest in the safety program may be gained from the fact that this page, according to surveys made among the readers of the magazine, is the most widely read.

Its layout is partially responsible for its popularity. Charts and pictures are used to break up the printed matter and make it less difficult to read. Graphs are used to present inherently dull statistics in a more interesting manner. Each issue features photographs of new and significant safety devices or accident prevention techniques of real interest to employes. One issue showed a picture of veterans going through safety training as part of their reemployment routine. Another showed the way in which the overhead guard rails on a plant tractor saved the driver from severe injury or even death when a 200 lb. case of cone centers fell onto the rails.

The safety manual lists no rules; there is no table of do's and don'ts and no inflexible restrictions and regulations. Instead, employes are appealed to by comparing the advantages of carefulness and the disadvantages of carelessness, by competition among departments and competition among individuals.

Every issue of *Crown Rayon News* has featured competition. The competitive factor has been extremely important in reducing accident frequency figures. At the top of each safety page a bar graph shows the plant standings in the interplant safety contest. These are watched closely by employes and the effort to raise plant positions on the chart has taken a real hold on the imagination of the workers.

A series of incidents which has been taking place at one plant, long

Program Reduces Frequency Rate 3.3 Points

BRIEFED—The realistic safety program at American Viscose Co. has reduced the accident frequency rate from 7.3 to 4.0. The plant organization which carries out the program, the outstanding philosophy behind the program, and methods used to effect its success are discussed here.

on the bottom of the contest list, illustrates the effectiveness of competition. About 2:30 o'clock one morning the telephone rang in the home of the safety supervisor. Dragging himself out of bed, he struggled to the instrument, picked it up and answered.

"Is that you, Johnson?" a muffled voice asked.

"Yes," answered the sleepy safety supervisor, "whad'dya want?"

"When are you going to get us off the bottom in that safety contest?" came the suppressed rejoinder, followed by the click of the receiver.

After several months of regularly disturbed sleep, Johnson finally dragged his plant off the bottom. For some time his nights went undisturbed, but at length a series of misfortunes forced his plant back into last place. Since the day that this was announced in *Crown Rayon News*, his nocturnal nemesis has again made his life miserable.

Departmental contests, conducted on the basis of accident frequency rates, are recorded on large, prominently displayed bulletin boards. Lost-time accidents are indicated by a red light.

One type of competition among employes is based on their ability to remember plant safety slogans posted conspicuously on bulletin boards. At regular intervals, a group of names are drawn from a hat. The employes whose names are thus selected are queried by the safety supervisor. If they can remember the safety slogan in question, they are awarded a cash prize on the spot. Any prize money which is not awarded goes back into the fund to swell it for future contests.

Competition, publicity in the company magazine, devices and slogans are all only methods of implementing the company's fundamental safety philosophy. American Viscose feels that the safety movement is growing, not so much by each seeking first to establish his own safety, but by the generous aid shown by many in securing the safety of others.

Although seldom used, it is important that when gas masks are needed they be worn correctly, and, therefore, demonstrations and training in their use are given by the company.

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IN less than four years the accident frequency rate at American Viscose has been reduced from 7.3 to 4.0. This accomplishment is largely attributed by corporation executives to effective organization, intensive publicity and widespread competition among employes. Acting as the integrating and motivating factor for the tangible phases of the safety program is the company's underlying philosophy of accident prevention. George T. Eppley, corporation safety engineer, sums it up this way in the booklet, *Safety at A.V.C.* "It is because human life and happiness are of such immeasurable value that we try to make our plant working conditions safe."

Mr. Eppley is in charge of molding his philosophy into a workable and realistic safety program for American Viscose's many plants. For administrative purposes safety engineering is considered a part of the Industrial Relations Department. Each manufacturing unit or plant has its own plant safety council. This group holds monthly meetings and reports regularly to the plant manager. The corporation safety engineer maintains liaison with the council through a safety supervisor in each plant. To carry out the corporation concept of safety as a part of the Industrial Relations Department, the safety supervisor is a member of the personnel department. From a functional point of view, however, his primary task consists of coordinating the planning and the activities of the corporation safety engineer, plant safety council and departmental safety committees.

Much of the work of creating safe thinking, safe conditions and safe practices is carried on by these safety committees. There is a safety committee meeting regularly in each department, usually with a foreman or department head acting as chairman. Members of the committee usually hold office for about six months, thus giving everyone a chance to serve as a committeeman. In this manner general interest in the safety program is stimulated and an influx of new ideas is assured.

The safety division is, of course, a staff or service unit and has as its main function the giving of assistance to line executives to enable them to make the program more effective in their own operating units.

The company magazine, *Crown Rayon News,* is supplementing efforts of the safety division by giving an entire page of each issue to the safety program. An estimate of employe interest in the safety program may be gained from the fact that this page, according to surveys made among the readers of the magazine, is the most widely read.

Its layout is partially responsible for its popularity. Charts and pictures are used to break up the printed matter and make it less difficult to read. Graphs are used to present inherently dull statistics in a more interesting manner. Each issue features photographs of new and significant safety devices or accident prevention techniques of real interest to employes. One issue showed a picture of veterans going through safety training as part of their reemployment routine. Another showed the way in which the overhead guard rails on a plant tractor saved the driver from severe injury or even death when a 200 lb. case of cone centers fell onto the rails.

The safety manual lists no rules; there is no table of do's and don'ts and no inflexible restrictions and regulations. Instead, employes are appealed to by comparing the advantages of carefulness and the disadvantages of carelessness, by competition among departments and competition among individuals.

Every issue of *Crown Rayon News* has featured competition. The competitive factor has been extremely important in reducing accident frequency figures. At the top of each safety page a bar graph shows the plant standings in the interplant safety contest. These are watched closely by employes and the effort to raise plant positions on the chart has taken a real hold on the imagination of the workers.

A series of incidents which has been taking place at one plant, long

Program Reduces Frequency Rate 3.3 Points

BRIEFED—The realistic safety program at American Viscose Co. has reduced the accident frequency rate from 7.3 to 4.0. The plant organization which carries out the program, the outstanding philosophy behind the program, and methods used to effect its success are discussed here.

on the bottom of the contest list, illustrates the effectiveness of competition. About 2:30 o'clock one morning the telephone rang in the home of the safety supervisor. Dragging himself out of bed, he struggled to the instrument, picked it up and answered.

"Is that you, Johnson?" a muffled voice asked.

"Yes," answered the sleepy safety supervisor, "whad'dya want?"

"When are you going to get us off the bottom in that safety contest?" came the suppressed rejoinder, followed by the click of the receiver.

After several months of regularly disturbed sleep, Johnson finally dragged his plant off the bottom. For some time his nights went undisturbed, but at length a series of misfortunes forced his plant back into last place. Since the day that this was announced in *Crown Rayon News,* his nocturnal nemesis has again made his life miserable.

Departmental contests, conducted on the basis of accident frequency rates, are recorded on large, prominently displayed bulletin boards. Lost-time accidents are indicated by a red light.

One type of competition among employes is based on their ability to remember plant safety slogans posted conspicuously on bulletin boards. At regular intervals, a group of names are drawn from a hat. The employes whose names are thus selected are queried by the safety supervisor. If they can remember the safety slogan in question, they are awarded a cash prize on the spot. Any prize money which is not awarded goes back into the fund to swell it for future contests.

Competition, publicity in the company magazine, devices and slogans are all only methods of implementing the company's fundamental safety philosophy. American Viscose feels that the safety movement is growing, not so much by each seeking first to establish his own safety, but by the generous aid shown by many in securing the safety of others.

Although seldom used, it is important that when gas masks are needed they be worn correctly, and, therefore, demonstrations and training in their use are given by the company.

Keeping The Identifying Finger On Industrial Products

The positive identification of products and materials is important in most industries all the way from the front office to the shipping room.

One of the most common ways to identify products is to mark them in some way. Marking may be done free hand with a crayon, marking pen, or a paint brush. Or it may be performed by mechanical means through the use of stencils, roller markers, metal print markers, die punches and other marking machines of a wide variety. Labels, too, are used in many cases for identification purposes.

Markings are classed according to whether they possess permanent, semi-permanent, or temporary qualities. Permanent markings are necessary on products or materials that are going into storage or will be subject to rough handling. Markings of a semi-permanent nature are those that must stay on through fabrication processes. Temporary markings are suitable for identification needs that should last through a few handlings only.

Among the surfaces that have to be marked are the following: asbestos, burlap, cellophane, cement, ceramics, fabrics, glass, hemp, hides, leather, metal, paper, plaster, plastics, pottery, rubber, stone, wallboard, wax, and wood.

Items requiring identification marks are boxes, barrels, cases, cartons, packages, bags, as well as loose unpackaged items in the course of their manufacture, processing and fabrication. Some of the varied industrial applications are as follows: Blueprints, Charts, Drawings, Patterns, Templates, Maintenance items, Test results, Heat treat data, Laboratory pieces, Inspection approval, incoming goods, Stocks in storage, Outgoing products, Parts in Production, Parts to assembly, Different sizes of the same item.

Marking and checking crayons are available for all sorts of industrial uses.

Another kind of hand marking tool is the brush pen or fountain brush utilizing a spirit-type ink combined with analine dyes. Several types of felt tips or nibs and fast-drying inks of various colors are supplied by the manufacturers. These inks are smear-, water-, and weather-proof.

Mechanical Marking

Stencils are usually made of brass, copper, steel, aluminum, zinc, fibre, and stencil board. Stencil cutting machines cut various size letters, numbers or other desired designations. Special feed attachments can make circular stencils possible. Fountain brushes are also used for stencil marking.

Other mechanical marking devices are of such kinds as the following: individual letter, figure, or symbol stamps; hand stamps with fixed type, or with interchangeable type inserts; stamping dies; roller and wheel dies; hobs; molds; embossing dies; numbering heads; rubber stamps; and seal presses.

There are also marking attachments for placing a continuous impression on the bottom of crates or cases as they travel along a roller conveyor; bench-mounted, hand-marking machines; control-marking, code-dating machines; and machines for marking flat, round, concave, convex, and other irregular surfaces.

BRIEFED: Every industry has to mark something sometime for identification purposes. Marking may be performed manually or mechanically and there are many ways and devices for such marking, as this article brings out.

Marking wood, rubber and plastics may be accomplished as well by burning or branding with an electric current or other heating arrangement.

Permanent marks may also be made on metal surfaces by etching with a chemical solution or by electricity.

Name and instruction plates are stamped, etched, embossed, or engraved.

Tape Markings

Tape is also an important medium for marking parts. For example, pressure-sensitive industrial adhesive tapes are used for the speedy identification of individual electric wires in a multiple assembly.

Another interesting application of tape has been for the functional marking of conduits and cables which were stored after fabrication and then later shipped out for use, and in many instances, had to retain their identity while in use. One conduit manufacturer obtained a calendered paper tape printed in several combinations of colors. The tape was backed with an adhesive developed to adhere under adverse conditions to highly-finished materials.

An addressograph plate was embossed with a part number and tabbed by means of a color code to correspond with the color of the tape. The tape which comes in rolls is then processed.

Color Identification

The use of colors for the quick identification of industrial products during their manufacture has met with considerable favor. In the assembly of Superfortresses by the Boeing Aircraft Company a wing connecting job was greatly improved by color-marking the parts and the places where they fit. A steel template was used. Upon it was photographed a complete replica of the connecting area including all bolt holes. Each hole was circled by a color paint to designate the size of the bolt to be used in it. Each size of bolt had a distinguishing color.

In the middle of template was a multi-bin compartment. Each bin which held certain sized bolts was colored to match the colors on the bolt holes.

Similar color identification has also been used on engine assembly.

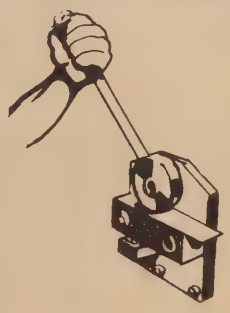
Where several different sizes of the same item or similar parts go into an assembly line at one point, or at different points, these parts can easily be color-identified as to size or other basic factor or distinguishing quality such as heat-treat numbers, specification characteristics, alloy composition, the kind of metal and so forth. This color distinction helps to make more certain that the right items are being delivered to the right assembly or machine-operation station. In addition to simplifying the job of the materials handler or delivery clerk, color marking aids the mechanic, machine operator or assembly man in making sure that the part is the right one for a particular operation or assembly.

Where similar parts of different sizes or specifications have to be shipped to another plant for further processing or assembly, color identification can also be extremely valuable.

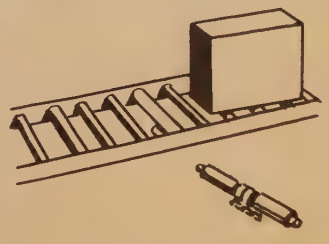
Coloring of this sort may be accomplished by means of paint, marking pens, or colored industrial tape.

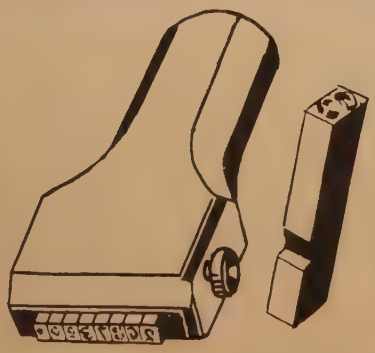
Appropriate colors for identification purposes of this sort are yellow, black on yellow, black on orange, red on white and white on red.

INDUSTRIAL TAPES

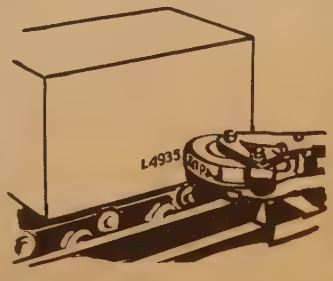


MARKING MACHINES





STAMPS AND PUNCHES



AUTOMATIC ATTACHMENTS

Innovations For Faster Welding

By William P. Brotherton

Technical Editor, Ryan Aeronautical Company

BRIEFED: Among the welding innovations devised at Ryan are the following: oxy-acetylene gas welding torch with two tips; a torch with three flame tips, one for oxy-acetylene and two for natural gas; tacking pliers and adjustable clamp; automatic conveyor machine for atomic hydrogen welding; electrode for spot welding in a narrow opening; tong-type welder for spot tacking an engine cowl; portable gun easily handled by women; and fast, accurate metallic arc welding practices.

IN THE YEAR 2000 B.C. some primordial metallurgist alloyed copper with tin to get bronze — a 14th century individual fused iron and carbon to make steel — and in the 19th century, man successfully welded one ferrous metal with another. Since these metallurgical milestones, no period in history has been so productive of fast new welding techniques than the past five years. The urgency of the need for fighting machines in World War II turned every industrial plant into a vast laboratory for finding streamlined methods of fabricating metals.

Under this intense impetus, the Ryan Aeronautical Company perfected rapid welding methods to "stitch" together over 100,000 huge stainless steel exhaust manifolds for the engines of America's warplanes.

Using a stack of stainless steel sheets each month weighing more than a dozen freight cars, this company has poured over 100 miles of welding rod into the molten seams which join the metal together by metallic arc welding. Staggering quantities of electricity, oxygen, hydrogen, acetylene and flux are consumed in the oxy-acetylene gas, electrical resistance and atomic hydrogen welding of the steel structures.

Ryan metallurgists and welding engineers have devised new fusion techniques as well as adapted the welding procedures of other industries to the special needs of aviation. Some of these unusual innovations may have valuable significance for other manufacturers who may meet similar problems.

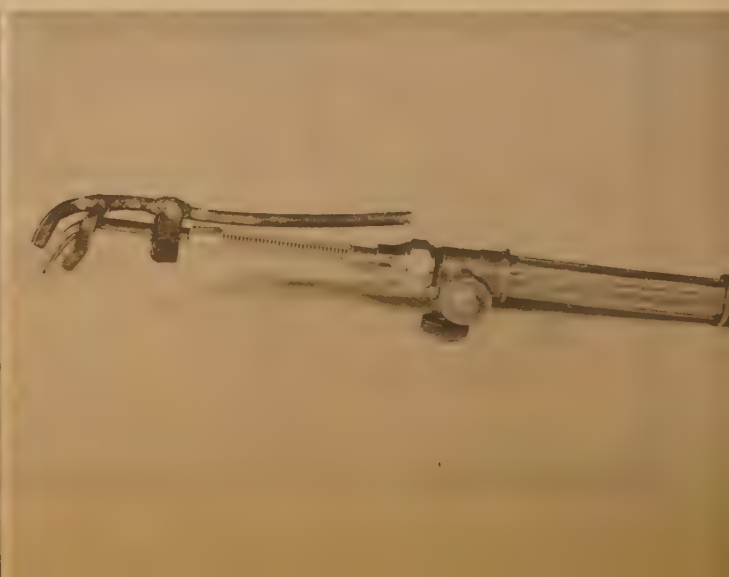
Two-Tip Torch

Frederick S. Dever, Welding Supervisor, devised a new type of oxy-acetylene gas welding torch which has two tips. This torch steps up the production of exhaust systems by performing two operations simultaneously; trimming the extra flange metal and welding the seam. Previously, it was necessary to trim this flange with a "jitterbug" cutter and then spot-tack the sections together prior to seam welding.

The tips of the torch direct the heat against opposite sides of the flange. The outside tip has a smaller diameter because it is the pre-heating tip. It pre-heats the metal and permits the welding speed to be raised from 2½ to 7½ inches a minute. One adjustment takes care of both tip flames. The increased temperature derived from two tips both strips the flange from the assembly and welds the remaining seam.

Another unique welding torch which Dever designed and built has three flame tips; a special pair of natural gas tips in addition to its oxy-acetylene tip. The natural gas is burned ahead and behind the welding tips to provide pre-heating and post-heating of the stainless steel. Natural gas flows ahead of the weld zone to pre-heat the metal and escapes through tip perforations to maintain weld area temperature after the weld is made. This port-heating is done so that the material

Welding torch with three flame tips—one for oxy-acetylene, and two for natural gas: one for pre-heating and one for post-heating metal.



A new, two-tip oxy-acetylene gas welding torch that performs two operations simultaneously—trimming extra metal and welding seam.

will not cool too rapidly behind the weld and cause cracking.

Welding Speeds Increased

Stainless steel has a high coefficient of expansion, twice that of mild steel, and therefore it is particularly subject to distortion. The effect of too abrupt a heating before, and cooling after, the weld causes a scissors-like stress which cracks the metal. The greater the welding rate, the more pronounced is this effect. Yet, rapid welding of stainless steel is very desirable because it reduces the loss of corrosion resistance of the steel. With this new torch, welding speed can be increased to six inches a minute with excellent results.

An advantageous feature of this welding torch is the prevention of oxidation of the metal by the flow of post-heating gas which protects it from the air.

In order to prevent oxidation of the internal weld seam in long closed sections, a novel technique is utilized. Natural gas is introduced into one end of the structure and the other end is sealed with wet asbestos. As the gas burns within the tube it reduces the atmosphere and effectively prevents the oxidation of the weld area by consuming the available oxygen.

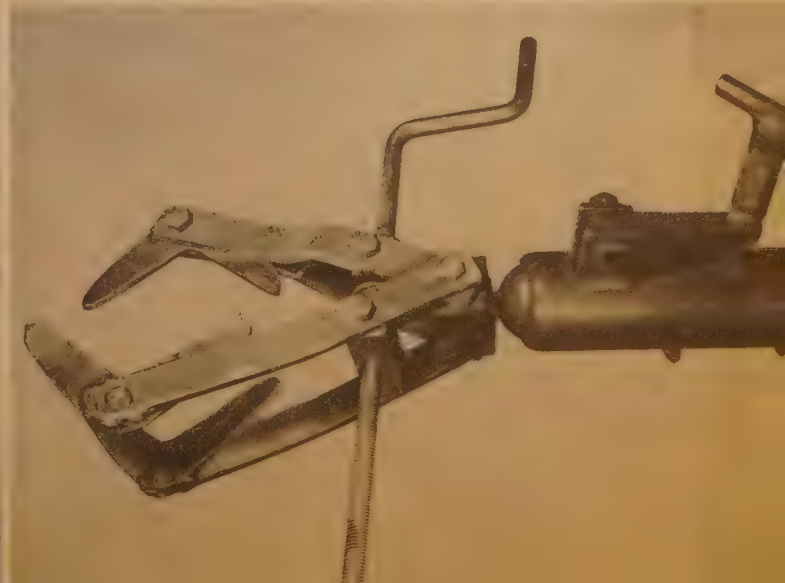
Two valuable tools which Ryan designed to simplify the welding job are the tacking pliers and adjustable clamp. These pliers are used to align and hold the edges of a flange for spot tack welding. The faces of the pliers are ground and hard-surfaced with Stellite. In addition to the claws there is a metal finger which extends down between the flange edges and lines them evenly for spot-tacking. Gas tacking, instead of spotweld tacking is used on structures of this type because of their large and complex shape. The clamp, snugly holding the steel section, is an adjustable model which fits any diameter. It extends down to a special ball and socket swivel for positioning in any plane.

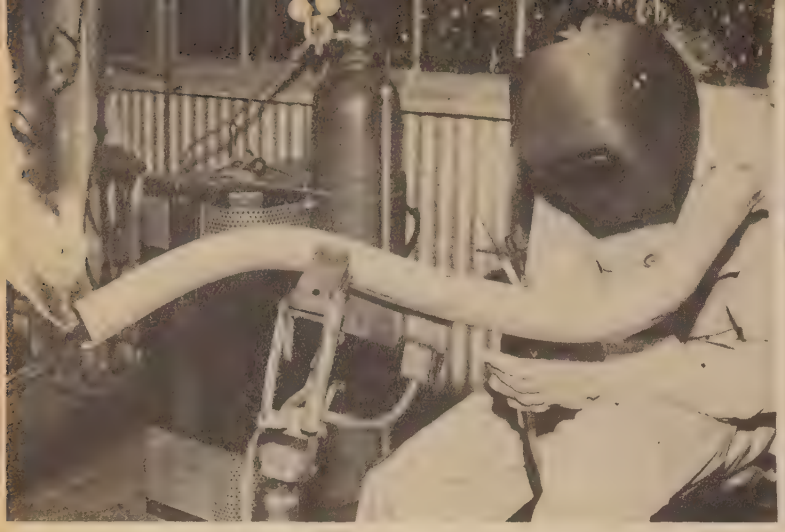
Atomic Hydrogen Welding

The Ryan Aeronautical Company was one of the first aircraft companies to install atomic hydrogen welding equipment in 1939. This process had proved advantageous in many ways in other industries but little information was available upon its use with the light-gage stainless steels of aviation. This company designed light-weight electrode holders weighing half as much as the standard holders supplied with the equipment. These torches made it possible for large numbers of women to be used in the atomic welding program. At Ryan, ninety per cent of the wartime atomic welding operators were women.

Atomic hydrogen is one of the cleanest and fastest methods for joining stainless steel. It adds no undesirable carbon to the welded metal and costs about one half as much per foot of weld seam as another comparable method. It derives its speed from the extra heat obtained from the molecular change of the

Two tools which simplify welding job. Pliers align and hold edges of flange for spot tacking and clamp snugly holds the steel section.





Atomic hydrogen is a clean, fast method for joining stainless steel. Molecular change of hydrogen adds heat to that generated by arc stream.

hydrogen gas which is added to that generated by the arc stream. The hydrogen absorbs energy as it passes through the arc and changes from a molecular to an atomic structure. Upon striking the metal, it is transformed back into its molecular form, releasing large quantities of heat.

In addition to increased speed and reduced costs, atomic hydrogen produces a highly ductile weld with superior microstructure.It lends itself nicely to the design requirements of the exhaust manifold industry.

To attain top speed in the welding of tubular sections of stainless steel with atomic hydrogen, Ryan designed and built an automatic conveyor machine which makes automatic atomic welding possible. Fast, smooth welding at the rate of 28 inches a minute is performed by these machines. This rate forms a striking comparison with the rates of 5 inches per minute or the 10 to 12 inches for comparative methods.

Rapid Spot Tacking

One of Ryan's greatest aids in taking the manufacture of exhaust manifolds from a hand method to a mass production system, was their development of the use of rapid "spot-tacking" for the assembly of stainless steel half-stampings. Before this innovation, the half-stampings were taken from the drop-hammers, thoroughly cleaned and assembled with clamps for seam welding. The parts had to be very carefully held together in the clamps so that the edges would fit correctly for the seam welding.

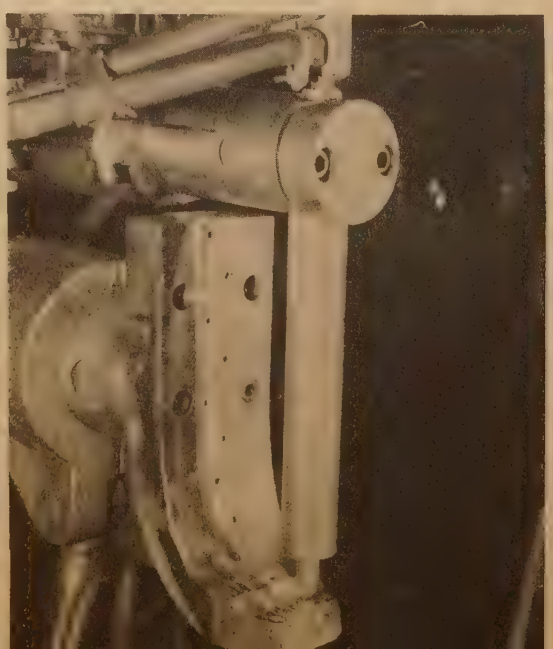
With the new technique, the half-stampings are quickly spot-tack welded together without the need for adjusting holding clamps. The operator holds the parts in alignment while as many as 120 spots per minute are located to "stitch" the parts together prior to the seam welding.

Many unusually shaped electrodes are used to spotweld odd or hard-to-reach assemblies. Erich Faulwetter, Sheet Metal Supervisor, designed a large electrode of heat-treated steel, with high strength to strength to prevent deflection, and a copper insert for good conductivity. It was developed to permit the spot welding of an extremely inaccessible structure by insertion into a narrow opening. The upper electrode is water cooled.

A tong-type spot welder, which has a mechanically operated pressure device has been very useful in the spot-tacking of an engine cowl. Pressure is exerted by a lever arrangement. This tool has a solenoid switch control for timing the dis-

This special electrode was developed to permit spot welding of an extremely inaccessible structure and inserting into narrow opening.

High quality welds with flash welding machines which bring two edges together in butt-to-butt fashion and establish an arc between them.



A conveyor machine for the automatic welding of tubular sections of stainless steel with atomic hydrogen makes top speed possible.

With new technique, the half stampings of exhaust manifolds ar quickly spot tack welded together without adjusting holding clamps

charge of current and extra long electrodes for reaching remote areas.

Portable Gun

Perhaps the most novel spot welding machine in the Ryan plant is a portable gun. Although this welder weighs 60 pounds, it is easily handled by a woman because it is suspended by a counter-balanced cable which holds it in any position. The electrodes are air pressure operated and water-cooled. Because it can be inserted into narrow openings of less than 3½ inches of vertical clearance, it is employed for many difficult jobs of spot welding such as the fabrication of engine cowlings and fire-walls.

No story about welding methods would be complete without mention of the fast accurate metallic arc process. With this means, the amount and location of the heat application can be more closely controlled. The melting starts and stops with the arc. By varying the current, exactly the right amount of heat for good fusion can be applied. Careful selection of filler rods must be made to insure that the added metal will not disturb the balance of the stabilizing agent or the carbon in the weld metal.

Highest Quality Weld

The highest quality weld is accomplished by flash welding machines which bring two edges together in butt-to-butt fashion and establish an arc between them. When the metal becomes molten, the arc is extinguished and the two edges are pressed together, or forged, in a shower of sparks. This weld will be free of impurities resulting from exposure to the atmosphere at high temperatures because a blanket of molten metal, which is later expelled, protects the plastic weld zone.

The contributions which the metallurgists and other laboratory scientists have made to the advancement of welding practices are enormous. Working with the metallograph, the spectrograph, carbon determinator and many other marvelous research machines has paved the way for metal progress.

We should not, however, forget that the welding supervisor, the plant engineer and the actual welding operator have all supplied industry with a generous share of their know-how to obtain our modern welding techniques. Most of the streamlined procedures and new devices in this field have been introduced by these experienced men and women who put their practical resources to the solution of industrial problems.

This easily operated tong-type welder, with a mechanically operated pressure device, has been useful in the spot tacking of an engine cowl.

Portable welder, weighing 60 pounds, is easily handled and positioned by a woman because it is suspended by a counter-balanced cable.

In this fast, accurate metallic arc process, the amount and location of heat application can be closely controlled for very good fusion.

How British Industry Hunts for New Things

By Dr. H. Buckley

BRIEFED: Four major groups carrying on British industrial research are: the research establishments of private industry; cooperative research organizations; Government research establishments, and the universities, principal centers for fundamental research. Activities of all are described here.

The first recognition of the importance of science to British industry was the founding of the National Physical Laboratory in 1900 for the maintenance of precise standards, the determination of physical constants of use to industry, and for verification of instruments. Full realization of the importance of science to industry, however, only took place during World War I when Britain and her allies found themselves seriously embarrassed for lack of supplies that formerly came from the hostile countries. This led in 1915 to formation in Great Britain of the Department of Scientific and Industrial Research "to promote and organize scientific research with a view to its application to trade and industry."

From the very start industrial research in Great Britain has been characterized by active encouragement and participation of the Government. One of its first actions was to establish a system of cooperative research associations, each connected with a particular industry. A later step was to set up Government laboratories in which research of an industrial character was carried out to meet needs of the community.

World War II provided a great testing period for British industry and industrial research as well as for the British people. The organization that had been built up between the two wars proved capable of dealing with the many emergencies that arose. The vast expansion schemes for extending the production of alloys for aircraft and armament purposes, for the large scale development of radar, and for carrying out such operations as building prefabricated harbors and laying underwater petrol lines, could only have been undertaken by an efficient industry using scientific and technical research.

Tests are carried on by the cooperative Cotton Research Association to determine fading of color when exposed to continuous light.

New Problems

Now British industry has to face other problems connected with expansion of Britain's exports, so that she may pay for her essential imports of food and raw materials and carry out her large housing program and the proposed extension of social and educational services. These problems can only be solved if British industry maintains a high standard of productive efficiency and if British products continue to exhibit the same qualities of originality, high quality and attractiveness, at reasonable prices, as they did before the war. With the experience of wartime research behind it, British policy is being directed to this purpose.

The instruments available for implementing of this policy are the research organizations of industry itself, the cooperative research associations, the Government research establishments, and the universities. Each has its special part to play, and each receives some form of assistance as well as encouragement from the Government.

It is generally agreed that the most immediately productive industrial research work is that done by individual firms in their own research establishments on their own behalf and with staffs thoroughly

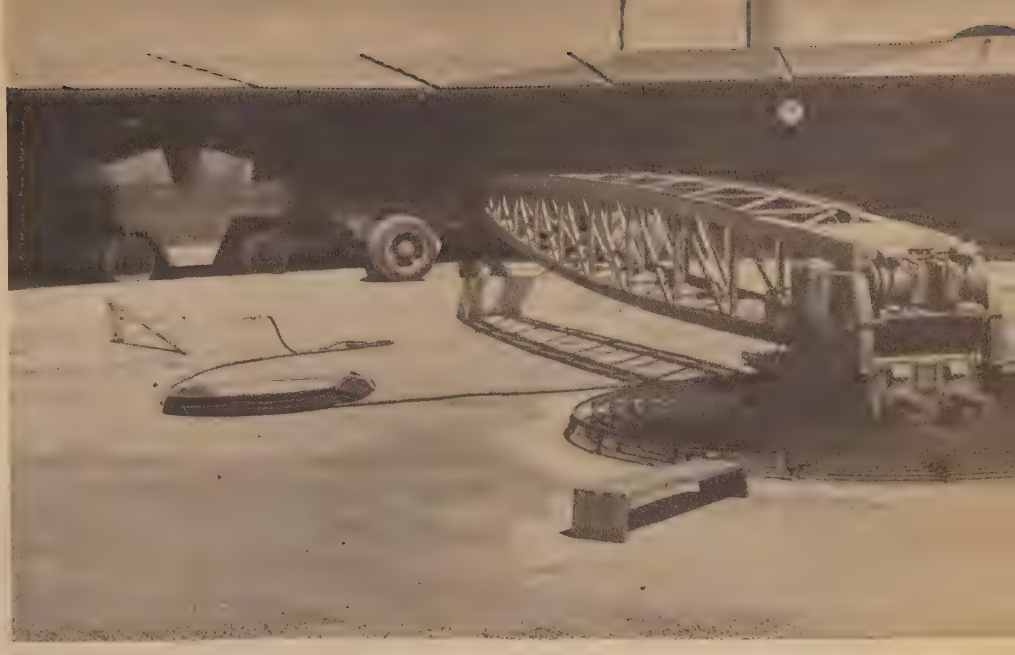
conversant with the particular needs of their customers. Many firms in Great Britain possess their own research laboratories, particularly the larger firms in the newer industries, such as the electrical, telecommunications and chemical industries. These industries are themselves the result of scientific research, often originally of a very academic kind, and often of purely British origin. The electrical industry, for example, is based on the fundamental discoveries of Britain's own Michael Faraday, while radio-communication can be traced back to the pioneer researches of Maxwell and Lodge on electric waves and to the vacuum-tube investigations of Crookes and Thomson.

Tax Deduction

It is the British Government's intention to encourage establishment of research laboratories by individual industrial firms as far as possible, but such work cannot be directly supported by means of Government grants. The Chancellor of the Exchequer, however, in 1945 provided that expenditure on research, including capital expenditure on buildings and on equipment, shall be deducted from profits in assessing liability to income tax, thus departing from the hitherto sacred principle that untaxed income shall not be used to produce additions to capital assets. This represents very considerable assistance to industry at a time when income tax in Britain is at the high basic rate of nine shillings in the pound.

Unfortunately, research is expensive, so that not every firm can afford to set up an establishment of its own for that purpose. Because of the large number of small firms for whom research was difficult, a cooperative research association scheme was introduced by the Department of Scientific and Industrial Research. This scheme is one in which problems common to a particular industry are pooled and investigated for benefit of the industry as a whole. These research associations are autonomous bodies mainly financed by contributions from the member-firms but also supported by grants from the Department of Scientific and Industrial Research proportionate to sums that the industries raise themselves.

Such organizations made important contributions to British war effort. The Cotton Research Association, for example, produced a cotton cloth the fibers of which are twisted in such a manner that they swell immediately on coming into contact with moisture and so make the cloth waterproof without any other waterproofing treatment. Methods developed by the Wool Research Association for preventing the felting and shrinking of woolen goods have been applied in production of underclothes and socks for the British forces.



At the Government's Road Research Laboratory, a rubber-tired roller is driven around a circular track to investigate soil compaction.

Government Research

Another important type of research is that caried out at the British Government's expense in the laboratories of the Department of Scientific and Industrial Research, to meet the needs of industry as a whole and to provide a basis of scientific knowledge on which to determine governmental policy with regard to industrial and national well-being. The Department has formed separate establishments in which research matters connected with fundamental activities such as building, water pollution, food storage, and road construction are carried out. In addition there are the Fuel Research Station, a Chemical Research Laboratory, a Pest Infestation Laboratory, a Geological Survey, and a National Physical Laboratory, which is the largest.

This National Physical Laboratory has divisions devoted to various branches of physics, mathematics, engineering, metallurgy, radio aerodynamics, and ship design. The radio division before the war of 1939-45 was largely responsible for the research, directed toward elucidation of the electrical properties of the upper atmosphere, which ultimately led to development of radar and to British supremacy in the application of radar to war purposes.

The need for encouraging development of what is sometimes called "pure" or fundamental research, that is, research caried out in a spirit of intellectual curiosity without concern as to whether its results will be of interest to industry, is fully realized. It has been abundantly shown in the past that such disinterested curiosity often brings to light unexpected phenomena which may, on development, serve as the foundations of new industries.

It is, however, on the universities that Britain relies principally for this type of research. General support of the universities is the responsibility of the University Grants Committee, but the Department of Scientific and Industrial Research makes special grants to individual research workers to enable them to carry out investigations of special timeliness and promise and to enable them to obtain special equipment or to employ research assistants. Several large industrial organizations are also substantially contributing to furtherance of fundamental research at the universities. Among these are Imperial Chemical Industries which have given 80 research fellowships of an average value of £600 ($2400) a year. The Shell group has given £435,000 ($1,840,000) to endow a chair of chemical engineering at Cambridge, and Courtaulds have given £110,000 ($440,000) for a similar purpose in London.

With the Government, the universities, industry and science working together in the closest cooperation in peace as in war, there should be no doubt about the future industrial prosperity of Great Britain.

12,000 Timing Chains

BRIEFED: Close quality control at every step of manufacture is necessary in making automobile timing chains at a New York State plant. A detailed analysis of the process is presented here.

The making of automobile timing chains at the plant of the Morse Chain Co., Division of Borg-Warner Corp., Ithaca, N. Y., requires operations similar to those performed in thousands of other factories. But there is a problem here of obtaining high-final accuracies with few or no final grinding operations. The accuracies must be close on dimensions and on the locations of holes and of other contours in relation to each other.

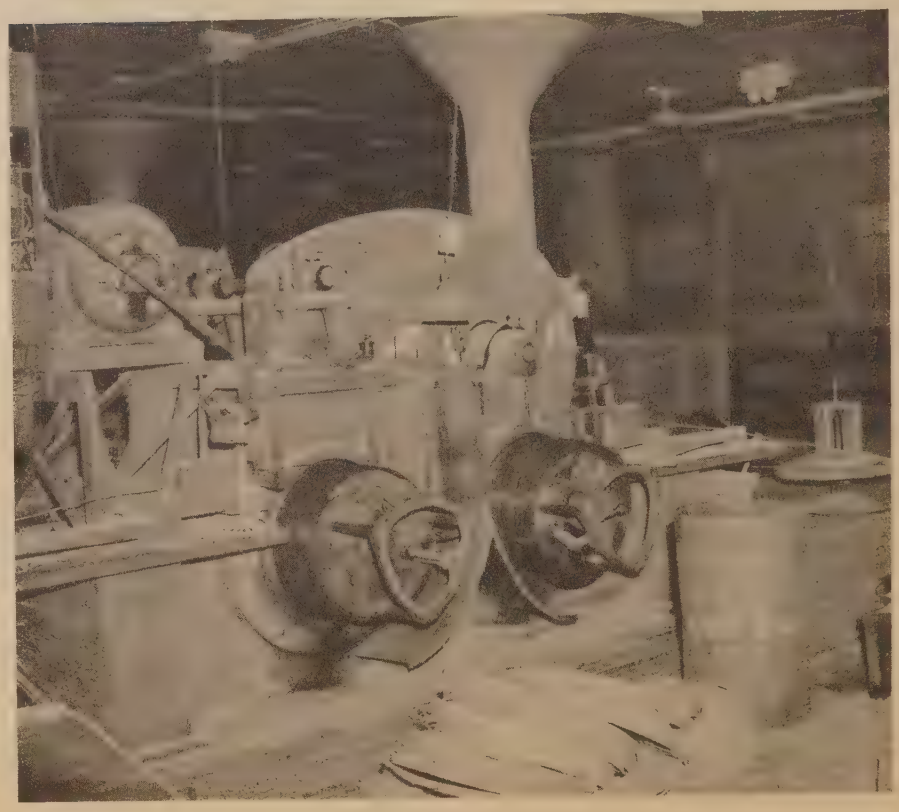
Final grinding must be avoided in this, as in many other shops which produce accurately contoured parts, because it would be prohibitive in cost. In making some 12,000 timing chains a day, this plant must make and assemble some 4,000,000 parts a day with such resultant accuracies that each complete chain when measured over two 20-tooth sprockets will show a length variation between center distances of the sprockets of not over plus or minus .005".

This represents an average tolerance per joint or pitch of the chain of only .00035". The total length tolerance is not obtained by holding every pitch to any such figures, but is an average which results when the high limit, low limit and intermediate parts cancel or balance each other's deviations from dimensional perfection. But dimensional tolerances of the individual parts have to be very close, and locational and contoural tolerances of the parts must be held correctly so that each individual pitch of the chain will function correctly. To obtain these accuracies without final contour grinding requires close quality control at every step of manufacture.

The chains are made of links and pins. For some chains additional segmented bushings are used, but since these are produced by much the same operations as the pins, they will not be described separately.

Selection of Stock

The links are stamped from strip stock. Control of this operation must be close. That control begins with selection of the stock.



A wire drawing machine.

Hot rolled strip stock 0.118" thick is purchased. Since this will be re-rolled to .060" at the Morse plant, the "as purchased" finish on it does not have to be even as good as the standard hot rolled finish. The steel is of special analyses, some with carbon up to the 1050 steel range, others of modified 1035 steel types. Ferrite strengthening manganese is specified high enough to approach that of mild alloy steel. The analyses are such that in the cold rolled condition the steels will have yield points close to their ultimate tensile strengths of about 115,000 psi, shear strengths of about 90,000 lbs., and be extremely clean cutting and free of plastic flow and of burrs in the stamping operations.

The hot rolled strip is taken from the storeroom, weighed and pickled. Then the rolling process begins. Ultimate thickness tolerance after the final pass through the rolls is plus or minus .00075". Because of this extremely close rolling tolerance, the company can re-roll its own stock for less than the size and tolerance extras would cost if the stock were supplied to these dimensions by the steel mill. In this re-rolling the physicals imparted by cold rolling working hardening and the grain directional strength are under close control within the company's own plant.

Careful control of coiling is important in the re-rolling operations. As received from steel mills, the hot rolled stock is in tight and small diameter coils to conserve shipping space, but in re-rolling the coils are kept to large enough diameters to be within the elastic limit of the material. Straightening operations when feeding the coiled stock into the

Daily Controlled to Thousandths

By E. L. Cady

presses, therefore, almost never are needed.

Two passes of the stock through the rolls will increase its Rockwell B Scale (Rb) hardness from about 85 to 95. After rolling, the stock goes to the presses where operations include piercing, shaving, blanking and cutting up of the scrap.

Blanking Duplicate Pieces

Contours of the finished parts are such that the most economical use of the stock calls for blanking duplicate pieces from both sides of the major plane of the strip, these pieces being in reverse position to each other as blanked. For high impact values after heat treating it is also necessary that the "grain" or rolled in fibrous structure be parallel to the pitch line of the links in which direction working stresses are highest.

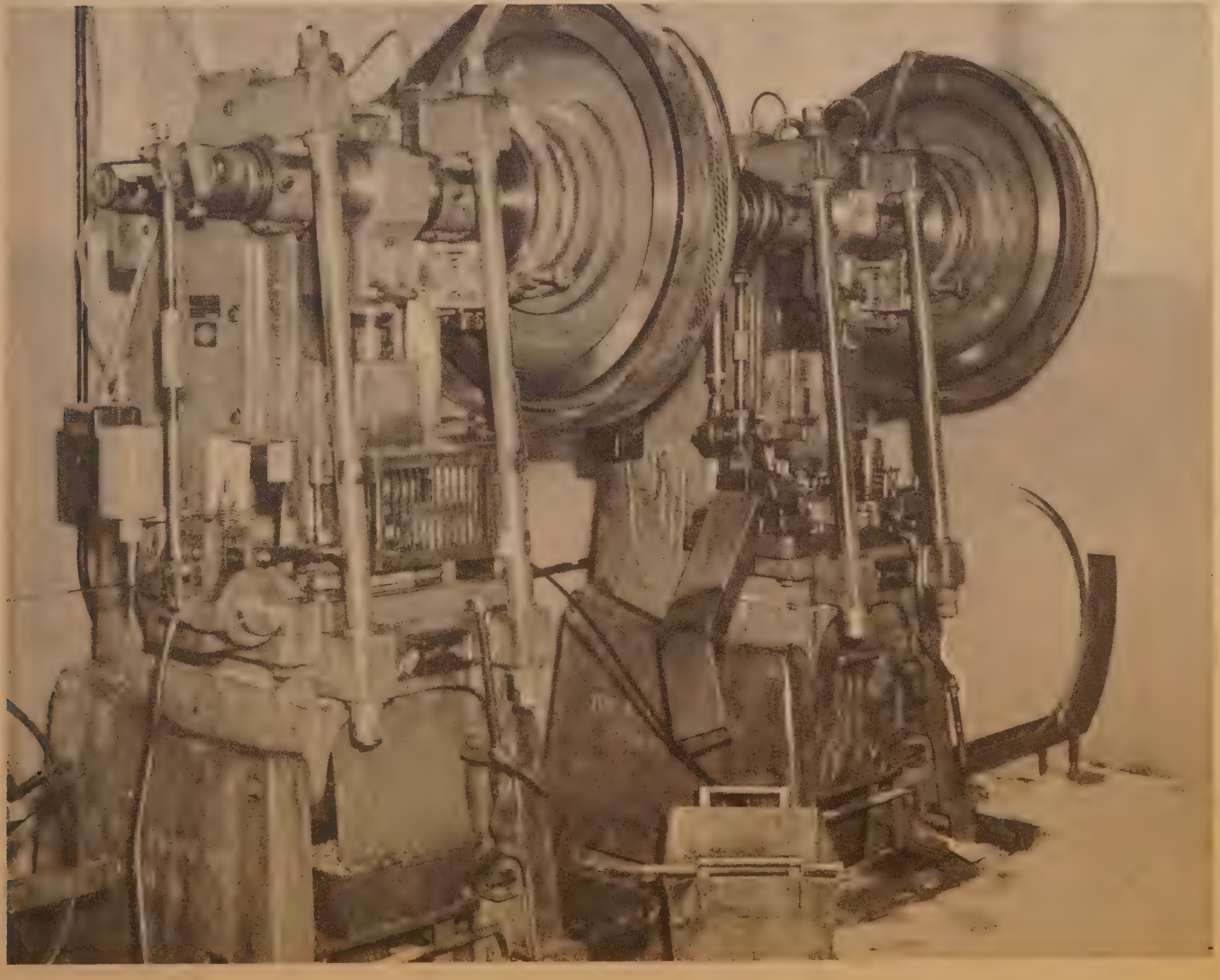
Present methods call for one, two or three presses in line, and the working out of guided punch and die systems, by which fewer and higher speed presses will displace larger numbers of slower speed presses to obtain the same or better parts, is an important part of the $1,250,000 modernization program which this plant is undergoing.

With a three-press setup the stock is fed to the first press by an automatic unwinder and a roll feed both of which are actuated from the crank-shaft of the press. The stock is lubricated automatically with a mixture of one-third lard and two-thirds mineral oil.

The first die pierces four holes. Because of the "anti-whip" or no-back bend construction of the timing chains these holes are not round but are of special shapes which provide the seating and bearing surfaces of the links.

In many of the chains these holes are "shaved", which is accomplished progressively in the first die by broaching the undersized pierced holes with four shaving punches

A two-in-line guided punch setup.



formed to the final size.

Correction of inaccuracies of the feed and lateral positioning is accomplished by a single, tapered nose pilot punch which projects slightly ahead of the pierce and shave punches and causes the stock to move whatever small amount is needed to register it exactly. The stock then moves on to two blanking presses so arranged that the stock feed beneath the beds of the presses then is looped and feeds back in an opposite direction. The purpose of this is to put any burrs all on one side of the parts, and to permit the blanking punches to flatten out any bending which may have occurred during piercing.

There is some doubt as to the value of this reversal of the ribbon. On the single and two press setup, it is not done and there are no apparent differences in qualities of output. However, final opinion on this point is reserved for further experience.

As the stock enters the second press it again is engaged and registered by guide or "placer" punches. In this case the places are fitted into the blanking punches themselves and are carefully positioned and gauged for accuracy before the die is placed into production. The stock is advanced through the second and third blanking presses by a hitch feed device by which a pin engages one of the holes in the ribbon and pulls the stock forward one pitch length for every ram cycle.

Final accurate positioning is done by the placers just before the punch engages the stock. Final shearing of the scrap is by a guillotine ram actuated by the press ram.

Accuracy Required

Because of the extreme accuracy needed and the high shear-ability of the specially prepared stock, the dies on these presses have only .001" clearance, thus high accuracy of setup and careful preparation of the shaped punches and dies are required.

Locating of these holes in relation to each other and to the contours of the final blanked pieces is accurate to plus or minus .0005", and is kept so by this guided punch method. This extreme positional accuracy is needed for the required pitch accuracy of the finished chain. The finished blanks are square and free of taper at all punched contours.

Inspection for hole spacing is by means of specially built micrometers and for hole positioning by routine checking on optical comparators against master glass charts of 20 times size.

In the three press setup only one link is blanked at a time. This requires but a single punch and one aperture die for each blanking die set.

In the two press setup two links are blanked at each stroke of the second press. The same general scheme is used in piercing and shaving in the first press with, however, somewhat more elaborate provision for maintaining close relationship of all four holes so that accurate relationship of holes to outside contour of the links can be maintained in blanking.

The single press method for producing timing chain links uses a progressive piercing and blanking die which produces two finished links at each stroke of the press.

In the two and three press setups the presses are not positively synchronized. Each is run independently by its own variable speed motor. The stock between presses is run in enough of a loop so there is adequate storage to provide plenty of time for adjusting the speed of any press if another gets seriously out of time with it. Experience will decide which setup is preferable for each size of chain the company makes.

Links For Large Chains

An interesting side-light is on links for chains which are much larger than automobile timing chains. When the link reaches a certain size the stress relieving effects of the hardening temperatures will cause the holes to move slightly out of position. This applies to links 1.25" or more on their longest critical dimensions. Such links are put through a heat treatment stress relieving operation before final shaving to size. And whenever shaving is to be done in secondary operations subsequent to the gang presses, the ejection mechanisms of the gang presses are equipped with rods or other stacking devices which position the pieces for feeding to the shavers without any need for a separate picking up operation.

Pins are made of steel similar to 8162 N.E. having .40 to .70 nickel, .50 to .70 chromium, .15 to .25 molybdenum, .10 to .15 carbon.

This stock is received in hot rolled finish coils. It must be redrawn to shape at the plant, usually to a semi-elliptical shape the flat side of which is formed into a re-entrant angle.

It is pickled in 5% sulphuric acid to roughen its surface, given a lime bath, immersed in a coating solution at 190°F. for 15 to 20 minutes or until the stock attains the temperature of the bath, flash baked in a forced convector gas fired oven using recirculated air at 450°F. for 10 minutes, then drawn with dry soap used as the die lubricant. Dependent upon size and shape, as many as seven passes through the dies may be needed.

A stress-relieving treatment is given after each pass with the exception of the final one to restore the 85 Rb and to take out the cold work strains.

The stress-relieving is not a full anneal but is done at sub critical temperatures, a method commonly called "process annealing". The material is placed in a salt bath containing a eutectic mixture of sodium carbonate and potassium chloride and is heated to about 1325°F., the furnace being an Ajax type of 175 Kw capacity. After being held for sufficient time to heat it through, the material is allowed to cool in air to about 700°F., this temperature not being observed closely since any temperature below a red heat will do. As a final step the material is quenched in water to wash away any salt that may be clinging to it and to get it down to the temperatures at which further handling and working are practical. Quenching direct from the furnace is avoided because it is believed that better control of the physicals is obtained by slower cooling.

Round drawing dies are tungsten carbide. The shaped dies are Wortle type made of a fully austenitic manganese steel which work hardens rapidly and which, when worn, can repeatedly be restored to shape by peening the flat or delivery side of the die to restore the necessary volume of metal and then driving through a master drift tool to restore the shape and dimensions of the hole.

The finished stock is cut to length in a punch press. Each piece as it is cut is forced down between the resilient webs of an open periphery steel drum. The cut piece is parallel to the axis of this constantly revolving drum. Any piece which is too short will fail to engage the webs of the drum and will fall down through the drum into a scrap tray. The drum feeds to a pick up device which automatically ejects the accurately cut pins.

The pins are heat treated; the round pins centerless ground to size, then tumbled to knock off their edges and obtain a modified corner chamfer.

Annealing Pins

After heat treatment the ends of the pins must be annealed to soften them for riveting. For this the pins are automatically laid on a roller chain which acts as a carrier, the pins being longer than this chain is wide and being laid parallel to the roller chain pins. This chain carries them continuously through gas flames. There are three flames for each end of the pin and the flames are staggered so not too much heat is applied to any pin at one time. Later on this operation will be done by induction heating.

Heat treatment of these parts, links and pins alike, must be very closely controlled in order to secure the desired hardness, depth of case, and physicals, without disturbing the very high accuracies secured by preceding processes.

Future modernization calls for putting many heat treating processes directly into the production lines in order to obtain a straight line production. Right now the heat treatment is in a department by itself for the most part.

Present heat treatment is by salt bath. The time of immersion in the bath at 1675°F. depends upon the depth of case desired and may range from 30 minutes to six hours to obtain case depths from .010″ to .060″. Quenching is in oil, followed by tumbling. All temperatures and cycles are automatically controlled.

One interesting method calls for handling the parts in steel baskets. Much experimenting had to be done to find the most economical size basket in which the pieces in the basket interior would be hardened to a satisfactory depth without getting too deep a case on the exterior ones. It was found that baskets of not over 5″ outside diameter by 15″ high would permit the interior pieces to receive at least an .012″ case while the exterior ones received no more than .016″.

Seven of these baskets are suspended together in a pot 30″ long by 15″ wide by 18″ deep. After hardening the basket loads are quenched in oil. The basket loads are raised from the oil bath, allowed to drain, then transferred to 200°F. water baths where each basket is revolved so it acts like a tumbling barrel to remove the last traces of hardening salts and of oil.

Tumbling

Tumbling of parts for final cleaning is somewhat difficult in that some of the holes and other contours are so small that few of the standard tumbling mediums will enter them. Silica sand is used as a tumbling medium.

Assembling is done in special machines designed by this company. These machines automatically assemble the links and pins in coils which are long enough to make from eight to 10 chains. Riveting is a separate operation performed in specially built toggle presses.

The long coils are mounted on rollers which then are hydraulically forced apart so as to impose a stress on the chain of at least one fourth of the chain tensile strength. The coils are bathed in oil and the rollers revolved for several minutes. This has the effect of seating the chain parts and if there are any serious inaccuracies in a chain or any bad links it will show them up. It is in no sense a method for "running in" the chain, but it does reveal any serious flaws and prepare the chain for final inspection.

The coils are separated into actual chain lengths, the chains riveted into their final lengths and each chain is measured and given a careful hand inspection by highly skilled operators.

Daily routine laboratory checks are made upon chains taken from production which include tensile tests, noise tests, endurance runs and "speeder" runs to determine the chain's resistance to pitch elongation or "stretch" in service on engines.

The finished product.

Handling Materials at Furnaces

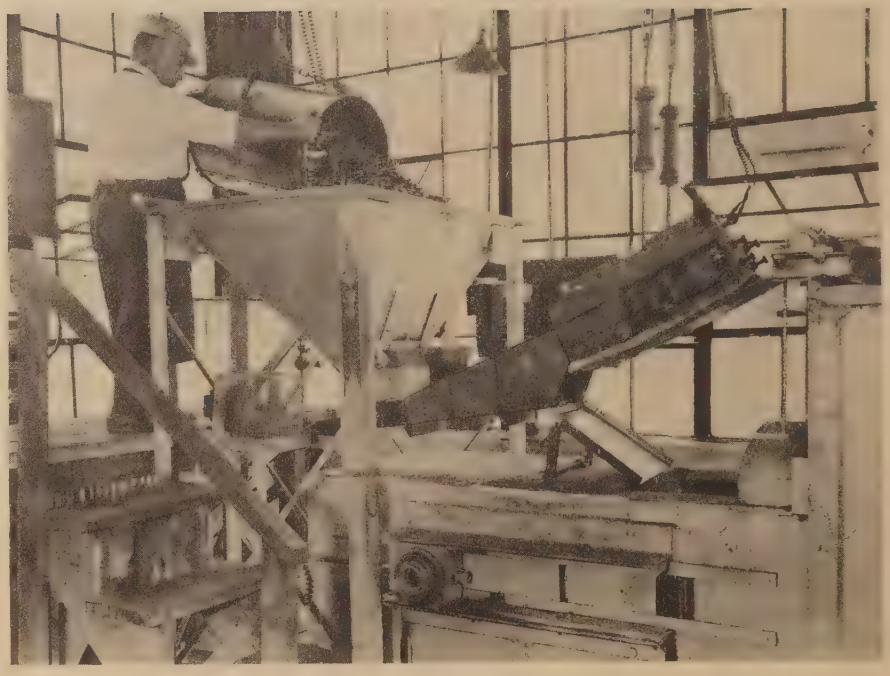
By John E. Hyler

THE SCOPE of materials handling applications at furnaces in industry is exceedingly broad. Therefore, the title given above is also broad. Furthermore, any consideration of the handling of fuel to furnaces, and the handling of ashes away from them would be extensive in itself. With this angle, however, the present article does not primarily concern itself. It deals chiefly with handling metal and metal parts around furnaces.

Even here, it will be necessary to consider the matter somewhat in abridged form. But it is believed that even a brief discussion will be profitable. Because of the heat that is present in varying degrees, depending on the particular application, handling methods around the furnace are often varied considerably from those used elsewhere.

Handling facilities are in many cases built directly into furnaces, simplifying what would otherwise be very difficult handling problems. Melting furnaces of different kinds are trunnion-mounted, and arranged so they can be tilted for pouring. There are furnaces of continuous pusher-car type in use in different places, and many build what are ordinarily known as car type furnaces. Various other furnaces are made with roller hearths. Some are made with rotary retorts, in which material is gradually moved from one end of the retort to the other, in process of combined heating and tumbling.

Other furnaces are built with reciprocating mechanisms, or with through conveyors. Rotary hearth furnaces are also in use in many places. Continuous conveyor types of furnaces sometimes make use of an overhead chain conveyor, and sometimes a conveyor of belt type. Revolving furnaces are very often used in connection with forging operations, and it is a comparatively simple matter to charge them, and withdraw material from them.



For a smooth even flow of small parts, they are dumped into an elevated hopper which loads the feeder steadily.

An Unusual Application

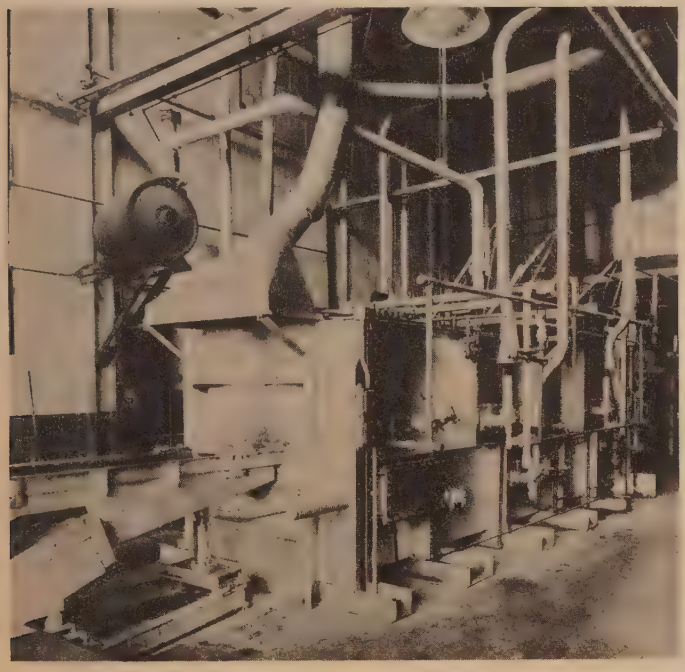
In connection with both annealing and case hardening operations at the furnace, special furnace pots are used, either to hold various parts in ordinary bulk form, or to hold them while packed in carburizing compound, as the case may be. Furnace pots used for these purposes must have special attention given to the material from which they are made, and the manner in which they are made, if they are to have a consistent life or working span. They are subjected to repeated heating and cooling, which means repeated expansion and contraction, a thing which is hard on any metal. Wire baskets, too, are much used in connection with furnace operations on many metal products, including annealing and hardening operations, and are made by various builders.

Carburizing operations for case hardening involve the use of carburizing compounds, and in some instances these compounds are handled in considerable quantity, at a given furnace installation. This is an out-of-the-ordinary handling operation at the furnace. There is involved the cooling of the compound, the removal of all ash that may have been produced in it by a furnace cycle just past, removal of any foreign metals, removal of dust, and conveying of the reconditioned material to a storage bin.

Later, the material is drawn again from this bin, mixed in proper proportions with new carburizing compound, and then conveyed back to the pot-loading station, where it is stored in an overhead hopper, or hoppers, to be drawn on by furnace pot loaders. To incorporate all of these handling functions for carburizing compound into a single system, and to make it automatic, might seem a big job, but it has been done by at least one company, which makes a specialty of installing such systems.

Plants which do not have sufficient carburizing work to allow of installing a complete system like the one outlined, can nevertheless enjoy as much of the benefits of mechanical handling as conditions may seem to warrant. There is one instance which came to attention, in which removal of the metal parts from the packing material was much facilitated through use of a simple monorail loop. One side of this loop passed over the furnace hearth, and

the other over a mechanical shake-out screen. A hoist and special grab is used in connection with the monorail loop. The loaded furnace pot is picked up from the hearth, hoisted, run around the loop of the monorail until it is suspended over the shake-out, and then dumped, the grab being designed to allow such dumping. Thus, the carburizing compound falls to the floor, while the separated metal parts are carried to the end of the screen, and into a container.



At the left in this view is a vibrating feeder handling small metal parts into a heat treating furnace.

In this special handling of pots for carburized material, the pot operates from an overhead monorail loop.

Furnace Charging

There are furnace-charging carts and cars of special type in use at different plants. Furnace charging and drawing cranes have also been developed by various companies, and are found in use in many places. A remarkable layout observed in one instance is used for quickly moving 400-lb pots from a hardening furnace to a quenching machine. The unit serves four or more furnaces, and incorporates a pick-up arm of horizontal type, that can be thrust into the furnace to engage the pot. This arm is supported from overhead, on a special swiveling truck, and the truck is mounted so it can travel laterally on the bridge of an overhead crane. The crane itself also travels on runways, at right angles to the travel of the swiveling truck. There are handles at the end of the arm mentioned, which are grasped by an operator, enabling him to exert manual control in some measure, though all of the heavy work is done mechanically.

On the operator's end of the arm is positioned a 900-lb counterweight, which plays its part in counterbalancing the weight of the furnace pot, when the latter is picked up off of the furnace floor. Connected to this counterweight is a ½ ton hoist, which assumes the actual handling burden. With this arrangement, the operator can lift his end of the arm to engage the furnace pot, run the arm into the furnace and engage, then lower his end of the arm to lift the pot clear. He then backs up the bridge crane, to withdraw the pot from the furnace, swings it around by means of the swivel action on the truck, and quickly deposits the load in the quenching machine.

One occasionally sees special furnace charging machinery in use, but there is not space for its consideration here. It is believed, however, that at least passing mention should be made of the fact that control of amounts of material by *weight*, with which furnaces are charged, is often a very important phase of handling at the furnace. Consequently, various leading scale manufacturers have produced special furnace charging scales.

Most of us have observed special hoists that are used in connection with blast furnaces, cupola charging, etc. Such are made by various manufacturers. Furnace hoppers also enter into the picture in some furnace handling operations. Without any doubt, however, the biggest end of the furnace-handling proposition is directly in connection with furnace conveyors.

Furnace Conveyors

Furnace conveyors are obtainable in different types from various leading conveyor manufacturers. While new furnaces are very often provided with conveyors, to make them continuous in their operation, it is often the case that the conveyor unit itself has been provided by one of these conveyor manufacturers, rather than by the furnace builder. Quite often, one sees a conveyor of overhead chain type, tied in with the plant conveyor system, and

BRIEFED: This article deals with the handling of metal parts around furnaces. In many cases the facilities are built directly into the furnaces. Among the equipment considered are furnace charging pots, carts, cars and cranes; special hoists; metal conveyor belts; and vibrating feeders.

routed through a furnace, for one purpose or another. One interesting case was observed where such a conveyor, fitted with special pendant hooks, for carrying coils of wire, transported the coils through a continuous annealing furnace.

Small parts can be and sometimes are held in wire baskets, hung on the hooks of overhead conveyors, for processing through a furnace. More often, such parts are run through a continuous furnace fitted with a belt conveyor layout. The conveyor belt used, in such cases, must be such as to allow the heat to get to the parts quite uniformly, and it must be such that alternate expansion and contraction will not result in its premature destruction.

Different companies have specialized in making endless belts suited to this purpose. One of these is made of a special chromium-nickel iron alloy, and is of open-link design. The link design allows of connecting or disconnecting the belt, making it possible to use it in existing furnace installations, when desired. An outside drive for such conveyors is used in practically every case, so the driving equipment is not subjected to the heat of the furnace.

Obviously, it is important that a metal conveyor belt for use in a furnace should have proper thermal qualities and at the same time provide high tensile strength, so it can carry the load imposed upon it without risking failure. Some manufacturers of wire and open-mesh cloth have made decided advances in these directions, and provide furnace conveyor belts which are ideal for copper brazing furnaces, or for units used in bright annealing, tempering, silver soldering and other heat treatments. Belts for furnace applications to and exceeding 2,000 degrees F. are quite regularly provided.

Furnace Trays

In some instances, units of metal proceeding through furnaces of different kinds, on a metal belt, are placed directly on the belt itself. In others, they are held in trays. Various manufacturers provide trays for this purpose, and like other equipment passing repeatedly through the furnace cycle, it is necessary to be very careful in making them. Some furnace basket manufacturers also provide furnace trays. Manufacturers dealing in special alloys also make them.

Sometimes, furnace trays are designed especially for handling given types of materials. Such an instance is found in trays of articulated design, made of material containing around 25% chromium, 10% nickel and 1% molybdenum, in cast form. These were developed for conveying brass strip in coiled form through annealing furnaces. Temperatures required to anneal brass sometimes exceed 1,000 degrees F., so it is necessary to have a tray that will retain its strength at high temperatures, and also one that will not deteriorate rapidly, or become brittle after repeated heating and cooling.

Where small parts are being processed through a furnace fitted with a conveyor belt, by placing them directly on the belt itself, it is necessary to find a method of applying a uniform amount of the parts, or a uniform layer, as the belt passes along. In order that this may be done to advantage, without depending unduly on the human element, special vibrating feeders have been applied to this type of duty. These feeders are made by different companies, and make use of an electromagnet, energized by pulsating current, in such fashion as to impart short but sudden motions to a feeding trough. This trough feeds the material to the furnace belt conveyor. In some cases, the trough actually extends inside of the furnace.

It would be interesting if we could fully describe the action of these vibrating feeds, but we must be content to say that the feeding impulses are very short and rapid; that the electromagnet pulls the trough in one direction with a snap action that really leaves the material behind, by reason of its inertia, then allows the trough to return with a slower motion, by means of springs, so it carries the material with it. Thus, the material moves through the trough in a series of short hops, but the impulses are so rapid that it appears to the eye to be flowing smoothly. In this manner, it is fed onto the conveyor belt of the furnace in an even stream.

The speed of the feed in a vibrating feeder of the type described can be varied by different means. One builder uses a rheostat in a separate electric control panel for this purpose. There are some instances, too, where it becomes necessary to provide an adjustable *intermittent* feed. For this, as for so many other industrial purposes, a timing control of the electric clock type can be used in connection. Thus, one can feed for 5 seconds out of each 10, or any other intermittent setup that may seem desirable. This is often done in view of the type of operations to follow on the material, as it emerges from the furnace on the belt conveyor.

A vibratory type feeder for handling small metal parts projects into a continuous heat treating furnace.

Company and union time study men making a periodic check on a coil winding job.

Union Helps Solve Production Problems

BRIEFED: By the proper approach, this company has obtained the complete cooperation of its union in solving production problems. The use of union time study stewards helps keep things running smoothly and quickly irons out employe questions about the incentive system.

Three years ago, the Dumore Company, in Racine, Wisconsin, found itself confronted with a problem that even now plagues many a manufacturing company. The old incentive system, on which the wages of production workers were based, was bogging down badly. Many workers could not understand how the system worked and both management and employes were dissatisfied with the results being obtained through the use of the system. As a result, a completely new incentive plan was set up and tried out, with the wholehearted cooperation of the employes' union—United Automobile Workers—CIO. The new system has proved highly successful, both from the standpoint of management and the employes, and has permitted the company to lick most of the production problems which caused so much trouble under the old plan.

The interesting feature about the new incentive plan is not the plan itself, which is after all a standard type of incentive system, but rather the method used by the company to put the new system into effect. In view of the very widespread antagonism that many unions have for incentive systems of all kinds, the Dumore approach shows what can be done toward getting the full support of union and employes. Needless to say, under present industrial conditions, no incentive plan can work successfully unless there is complete cooperation by the employes concerned.

Before setting up the new system the Dumore management called in the president of the local union and laid their cards on the table. They told him, in effect, that although the demand for Dumore products was reaching an all time high, production problems were reaching such a serious state that there was a danger of the entire working schedule bogging down. Moreover, as the union president well knew, the employes were very dissatisfied with the existing incentive payment plan. In fact, it was thought by management that this was probably the principal cause of many of their production difficulties.

Something had to be done and it was management's suggestion that an outside consulting firm should be engaged to put in an incentive system which would be agreeable to both management and employes. In order to prove to the union that management was not trying to put over some kind of speed-up program, or was trying to install a system that nobody but themselves could understand, it was suggested that two union stewards should be selected by the union and that they should receive the same training in time study and the operation of the incentive system as would be given to the company men. This was entirely agreeable to the union officials and a firm of industrial consultants was engaged to install the new system.

The first step was setting up a course in time study for both the union stewards and the company time study men. This course extended over several weeks and lasted about four hours each week. It covered the following general subjects:

1. The necessity of time study. Why time study should be fair to both management and labor. Why both management and labor should have a thorough knowledge of time study.

2. The use of a stop-watch. Continuous reading of a stop-watch. How to time jobs. Time study of a complete shop operation.

3. Calculation of a time study,

Time study group discussing the results of a shop study. Seated, left to right, Dan Clune, time study steward; Gerald Hansen, time study engineer; Stanley Schaeffer, time study supervisor; Charles Smader, time study steward. Standing, left to right, E.A.Cyrol, the consultant's engineer; Clifford Stonehouse, time study engineer; James Hamilton, Vice-President and Works Manager.

considering such things as allowances, establishing standards, converting all calculations into final labor costs, the use of base rates, etc. Determining standard costs for competitive pricing.

4. The consideration of leveling. The importance of trained judgment. The establishment and use of standard data and how it supports timed operations. Practice studies made in the shop in groups. Practice studies made alone. Several days were spent making a time study check of an entire department . . . to determine delay allowances that were necessary and to determine production quotas. These results were in turn checked by the consultant's engineers.

5. The data of a complete departmental time study was then reviewed by the whole group and it was demonstrated how this data can be used to make standards. There then followed several weeks of practice in time study.

Following the training course, the first big job for the company time study men to do was to set up standards for all the jobs in the plant. For, according to the agreement reached at the initial meetings between management and the union, all the then current production standards were to be scrapped without any attempt to "patch them up". This tremendous task of establishing new standards for all the operations was facilitated by the use of standard data that was established from the time studies taken. To date about two-thirds of the jobs have standard data. This forms a backlog of valuable material in establishing rates for all types of jobs and for proving the basis for any rates that may be in dispute.

The time study stewards do not enter into the task of establishing the production standards for the operations in the shop; that is considered management's responsibility. The primary purpose of the union's time study stewards is to explain the rates and how they are obtained to any employes who may question them. If necessary, these time study stewards will also recheck any established rates that may be in dispute, in order to satisfy both themselves and the employe in question that the rates are fair.

In order to keep in practice, once each month the time study stewards, together with company time study men make a study on some particular job in the plant. They then hold a group meeting and compare results and discuss any questions that might arise. The union president, any member of the union committee, or any executive of the company may—and do—attend this meeting to bring up any point pertinent to the smooth operation of the wage incentive plan. In this way the union men keep abreast of how the incentive system is progressing and have a chance to discuss any questions on rates which might arise in the shop.

That the new incentive system at Dumore has worked out so satisfactorily, is in a large measure due to taking the union into complete confidence and giving them an active part in checking rates and explaining the operation of the system. By having two time study stewards who are well acquainted with the system and the establishment of rates as are the company men, the employes feel that their interests are adequately protected.

SIMULTANEOUS STUDY

Company & Union. 4-30-46

Element	A	B	C	D	E	Std. Dat
Assemb. Form & Start Wire	.1050	.1044	.0957	.1562	.0772	.1320
Wind Coil	.1068	.1111	.0800	.0781	.1042	.1065
Tie 2 Sides	.3544	.3975	.3227	.3531	.3878	.3460
Remove & Place Aside	.0636	.0579	.0613	.0695	.0861	.1027
TOTAL TIME	.6968	.6709	.5597	.6567	.6753	.6872
Pcs. Per Hr.	89	81	97	82	80	79 Pcs.
% Variation	+13.2	+2.4	-22.7	-4.6	-1.8	
Group Average	.6339					
Average Group Variation	-8.4%					

Typical results of a simultaneous time study made by the five company and union men.

Strike Loads Bases in Company Educational Program

A fire fighting demonstration directed by D. A. Jones, supervisor of safety and suggestions, was part of the education program.

BRIEFED: When a strike was called at the Allis-Chalmers plant in Pittsburgh, Pa., the company started an educational program for its supervisors and other employes who continued to enter the plant. An account of the type of classes, lectures and demonstrations conducted during the strike period is presented in this article.

STRIKES do not necessarily place a ban on learning. This was proved at the Pittsburgh, Pa., transformer plant of the Allis-Chalmers Manufacturing Co., when, after a walkout March 22, 1946, of the CIO United Electrical Workers local union, the company made use of an opportunity to expand its educational program and to help supervisory employes utilize their time by becoming acquainted with the varied and numerous problems of management.

Conducting a school during a strike which might terminate momentarily presents a unique problem. The expanded program provided for eight conference or discussion groups in which all employes entering the plant, including clerks and supervisors, were asked to participate. Since work still remained to be done, even in a strikebound plant, attendance at the courses varied from one hour to an entire eight-hour working day.

A schedule was prepared whereby each of the groups consisting of from 25 to 35 persons, was rotated about eight stations located at convenient points throughout the company's four Pittsburgh plants. Starting at 8 a.m., each hour on the hour, the groups shifted to the next assigned station, each group moving on to the next higher numbered location—group 1 going to station 2, etc. Classes lasted 45 minutes, allowing 15 minutes intermission between each meeting.

Discussion Leaders

Designated as discussion leaders for each subject were two or three persons selected from all parts of the organization. A typical day during the program usually opened with members of a group being oriented in current events. During this first hour, discussions included the local plant labor situation in the light of daily happenings. Pertinent newspaper accounts were read and their affect on plant operation analyzed. Mimeographed memorandums provided employes with the status of the strike situation at each of the company's eight plants.

The second hour was usually spent examining problems of management, such as interpreting the latest management labor agreement and the actual application of its terms in practice.

The next two hours were devoted to a study of the materials and processes used in the manufacture of transformers. Speakers were engineers and expert factory technicians from outside the company who discussed their products on the invitation of Allis-Chalmers. Among subjects covered were structural and electrical steel, aluminum, copper wire and cables, porcelain insulators, insulating papers, fibres and cloth, transformer oil, paints and insulating varnishes, lumber and materials handling. Frequently these talks were supplemented with slides and motion pictures.

On days when outside speakers were presented, the study schedule was delayed by two hours. Groups 1 to 4 assembled at 10 a.m. to 12 noon at an assigned station and groups 5 to 8 met at the same place from 1 to 3 p.m. After attending a special session, each group continued on its regular schedule. The same number of subjects were discussed at the same number of stations at the same locations but 10 hours instead of eight were required to complete the cycle.

Films Shown

Nearly 200 films of all types ranging from "Petroleum and Its Uses" by the U.S. Bureau of Mines to "Glamour Gal" by the U.S. Marine Corps, were shown in connection with this program. Running time on these pictures varied from 10 to 62 minutes.

With the thought of improving citizenship and better acquainting the employes with the community in which they live, various service organizations, such as the Red Cross, Better Business Bureau, district attorney's office of Allegheny County, and the FBI, were also invited to send speakers.

Afternoon sessions were devoted primarily to manufacturing discussions and each department was given an opportunity to present its organization setup, duties and responsibilities, and actual details of operation. Departments represented at these sessions included both the service departments such as accounting, engineering, stores, production scheduling, maintenance, inspection, test, time study, and personnel, as well as actual production units. An intensive three-week study of budget systems was culminated by several conferences conducted by three accounting specialists from the company's main office in Milwaukee, Wis. In addition, subjects such as shop mathematics, business English, and public speaking were covered.

To lend variety to the program, some time was devoted to activities of interest to the individual. A camera and photography clinic was conducted. One of the girl clerks and a foreman discussed their flying experiences. Others described such hobbies as woodworking, amateur astronomy, touring the country in house trailers, chemical gardening and raising rabbits and pigeons. A spelling bee proved profitable as well as entertaining while discussions on "Getting Along With People" and "Everyday Manners" provided a broadening influence for their participants.

Field Trips

On some afternoons trips were made to various industries easily accessible by streetcar. These included visits to the local electric power generating station, telephone exchange, steel and food processing plants, newspapers, radio station, the Mellon Institute of Industrial Research, Buhl Planetarium, Cathedral of Learning, City - County Building, Memorial Hall, Phipps Conservatory and county and federal courts.

About 75 thank-you letters were sent by Allis-Chalmers to all outside speakers and companies who arranged visits through their premises in connection with this program, which was discontinued in its expanded form after September 16 when the Pittsburgh strike was settled.

According to company officials, the program was well received.

Because of the opportunity it afforded to persons normally engaged in carrying out both the policy making and routine operation of management to meet and engage in open and free discussions over a long period of time, the program resulted in a closer knit and better co-ordinated organization.

Meanwhile, schools for foremen, graduate engineers and apprentices were conducted at the firm's other strikebound works. Foreman programs at these schools included discussion of strike issues and labor relations developments and also provided the shop supervisors an opportunity to increase their technical knowledge and information of general plant operations. The schools for graduate engineers and apprentices permitted employes attending them to continue their regular training despite the strike.

"Electricity in the Home" was the subject of this safety class conducted by two foremen in the company's maintenance department.

A hobby class in astronomy was conducted by J. B. Hodtum, development and research engineer at the Pittsburgh Allis-Chalmers works.

Essentials Of Good Foreman Training

A company's employe counselors meet weekly to hear their supervisor discuss worker problems.

By Edmund Mottershead

BRIEFED: Properly trained foremen, particularly in the field of human relations, are one of the best assets an industrial firm can have in its plant. However, all too many foreman training programs are hit-or-miss courses with little planning on the part of management, and inspiring little respect from the foremen who are being trained. This article discusses some of the things a good training program should have, and includes a check list for management to determine if the existing program is meeting the proper goals.

Alfred P. Sloan, when President of General Motors Corporation, stated: "The human problem is far more delicate and difficult to handle than any production problem or distribution problem or engineering problem or financial problem. Psychology and personality constitute at least 50% of the material requirements for success as an executive. I have seen men with fine minds who failed to make their plans effective because they lacked understanding of how to work with people. In our business I should say that this psychological ability means 75% of the necessary equipment. The ability to get people to work together is of greatest importance."

Many foremen reach their position because of seniority, because they have mastered the technical features of their job or of several jobs in the department. The following discussion about foremen training or a self-improvement plan for foremen and supervisors, is with the assumption that the foremen are fully competent in the technical aspects of their jobs.

However, the foreman's work is not mainly with machines and methods and materials; his big problem is getting people to work under him and with each other. That the foreman or supervisor can increase his skill in handling people through a definite training program has been proved beyond question. How much his human relations skill will improve is another matter. That depends at least to a large extent upon the training program, which among other things must include these four elements:

1. The individual foreman or supervisor should enter into the training program with a strong desire to learn and use new skills.

2. He should have set before him definite and specific objectives, not only "units of learning" but definite results in the department.

3. There should be a definite program set up in writing.

4. There should be adequate means to check progress regularly.

Desire To Learn

The importance of starting any program of self development with a strong desire cannot be overemphasized. Dale Carnegie, who has trained some 6000 business men and industrial executives every year since 1912 says: "If your desire is weak and flabby, your achievements will also take on that consistency. But if you go after this subject with persistence . . . nothing can stop you. Therefore, arouse your enthusiasm for this study. Enumerate its benefits. Think of what it may mean and ought to mean in dollars and cents. Think of what it may mean to you socially . . . of the leadership it will give you."

Which is all very well . . . *if the foreman can be given adequate incentives by top management.* In training salesmen, it can be proved statistically to both management and the individual salesmen that training plus effort plus supervision yields increased sales and increased commissions. Percentages of increased personal earnings run as high as 35% in as little a time as six months after training. That gives the salesman an incentive to study, to master the elements in his training program.

The foreman all too often has no such incentive. In many plants his weekly check is already less than that of the skilled union member getting time and a half for overtime and working a total of possibly 50 hours a week. Too often management not only asks the foreman to join in such and such a training program, but will have the meetings in the evening, robbing him of some of his precious free time, will frequently neglect to pay him for that time, and in many instances on record even demands that the foreman pay from $75 to $150 for the training course itself. To make matters worse, not only has the foreman been reduced from an executive to a work leader in many industries, but he is offered no more management support, no more authority, no more promotion and *no more pay* if he does take the training successfully.

Consequently, if the first element of a successful program is to exist, the student's strong desire to learn, top management must provide in the program those incentives which will give the foreman a reason to take an interest in the training.

These incentives include:

1. Immediate compensation for time and effort. Pay the men for their time, at least time and a half. If in the evening, provide their transportation and dinners.

2. Buy the training for the men. Pay for all of it and let the men know that you are glad to do it for them because they are important to the top management and an important part of management.

3. Select the foremen and supervisors who take the training on the basis of length of service, experience, aptitude, character or some other set of qualifying standards so

that the group in training is a "select" group rather than just anyone that happens to work there. Set these standards to meet local conditions.

4. Set up a definite performance or merit rating program of foremen and supervisors, geared to the training program, so that promotions and salary increases may be foreseen by the men as the result of training plus effort on their part. Make it pay off for them IN CASH.

5. Sell them on the idea as an over-all program that this training is only part of a total program to integrate the foremen as a real and effective part of management. Among other things point out that if they apply the principles learned in the program to departmental work, they will get 100% backing from top management. And then give them the backing when the time comes.

Setting Up Definite Objectives

There are two types of objectives to consider here: the personal objectives of the foremen and supervisors themselves, and the organization objectives of top management. Both have an important place in setting up the training program.

The personal objectives of foremen and supervisors are expressed by the men in terms of increased income, promotions, recognition for merit, bonuses, etc. If the training is geared to a definite merit rating program, the personal objectives of the foremen in training can be clarified and satisfied. If the training is geared to group bonus or other income-incentives, the foremen have their personal objectives made still more definite.

Management's objectives should be specifically stated in terms of a goal of such-and-such percent less grievances, less turnover, more production, less scrap, etc. Be specific. Whether the goals are attained or not, or exceeded, at least the training in the minds of the foremen is aimed directly at their departmental problems and thus justifies the merit-rating setup.

A Definite Program

The exact units of learning in an individual training program will vary according to organization needs. There are a number of outside agencies which have prepared foremanship programs, but most of these do not fit easily into individual plant needs. One or two agencies establish tailor-made programs for their clients. The program should be in writing, a definite time schedule set up with meetings about once a week, not more than two hours in length. The best length of program has been found to be from 10 to 15 weeks, with a break of a couple of weeks and then continue another 10 weeks or so.

Sometimes we run into the top management which states bluntly that they have tried foreman training and found it a failure in their own case. In far too many cases the training they had was similar in form and content to the old familiar conference method. The conference method is good only when the group is made up of a number of men who are experts in different lines and who have the ability to participate in discussion and make a contribution. If the foremen can thus participate effectively, part of the problem is solved. Experience has proved that it is desirable for the first portion of the training program, 12 to 15 weeks or so, to be at core training in effective speaking, not "public speaking" but the ability to organize and express ideas effectively. Follow this with conference method training in plant policy and shop practice, and an entirely new result is obtained.

Aside from technical matters pertinent to the individual plant or organization, a good program might follow the broad general lines outlined below:

1. Instruction and training to increase the foreman's efficiency as the supervisor of a production unit. Methods of performing his own work, means of eliminating waste, safety training, worker-training and placement, and methods of adjusting workers to their jobs.

2. Education in company policies. Administrative education concerning basic principles of company policies as developed and applied in the individual plant, regarding business operations and problems, customer relations, quality of product, working conditions, community relations etc.

3. Human problems of employment relations. Education in basic labor legislation and personnel administration as well as in the field of employment regulations. If possible, the specific policies and regulations of the company, so that they may be thoroughly understood by the foreman and interpreted by him to his workers. This should include a study of the written presentation of the company's policies and regulations if there is such a document; a study of the fundamentals of harmonious relations with employes; a study of the factors that enter into the adjustment of the worker for his job, his fellow workers, and his company; a study of the best ways to introduce and explain changes to the workers; and a study of the psychology of human behavior to enable the supervisor to build morale, maintain discipline and get cooperation.

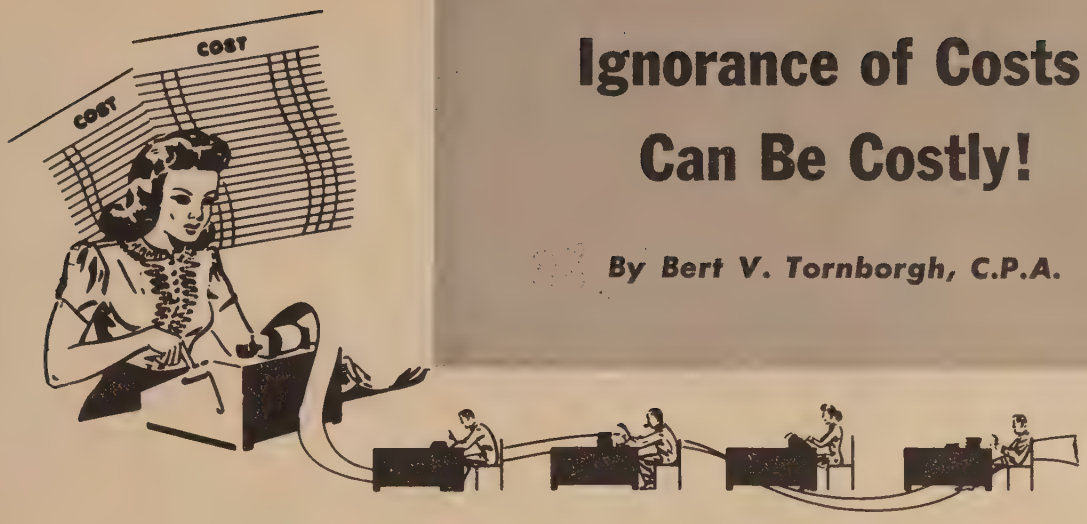
4. Cost and product information. Executive information that will enable the foremen to handle the fundamentals of wage incentive plans, cost analysis, departmental budgets and production schedules, production control, inspection and quality control, routing and dispatching, job analysis and merit rating.

5. Basic information . . . background information regarding the general problems affecting all business, and industry, as well as the particular company's business, including taxation, government expenditures, legislation, distribution of income, and business economies.

The question of having an outside instructor does not mean getting someone unfamiliar with the industry, but may be solved either by employing a training specialist in the industry part-time, or by borrowing an executive from another company. The point is that when the local program is conducted by the plant engineer or some other executive, it is all too easy for the leader to be in St. Louis on the day scheduled for the meeting; he is all too susceptible to the suggestion to postpone the thing for another week while they work out the trouble in Department 14. The outsider, if nothing else, commands a little more respect and consideration from all concerned simply because he is an outsider. And his presence tends to hold the whole program on the beam.

Check Progress Regularly

Nothing succeeds like success. When starting out on a new program, even with a strong desire to succeed, the learner needs to have encouragement, needs someone to show him that he is making progress. Having a definite written outline of the program to be covered means that a constant check is kept on the learning progress from the standpoint of material covered. Having specific objectives in terms of departmental results provides another means of checking. The merit-rating and performance-rating systems provide another means. When the supervisors and foremen can see their own progress and can get periodic and honest recognition for that progress, they have an additional urge to continue to improve.



Ignorance of Costs Can Be Costly!

By Bert V. Tornborgh, C.P.A.

PART IX

BRIEFED: The foreman's role in cost control is discussed in Part IX of this series on Cost Control. Forward-looking management will recognize the importance of the foreman in this role and will make it worthwhile to him in order to assure maximum cost control, the author points out.

From December 8, 1941, to August 18, 1945, production was a very important item in winning the war. True, cost was also important but the vital point was: Get the stuff out, and never mind the cost!

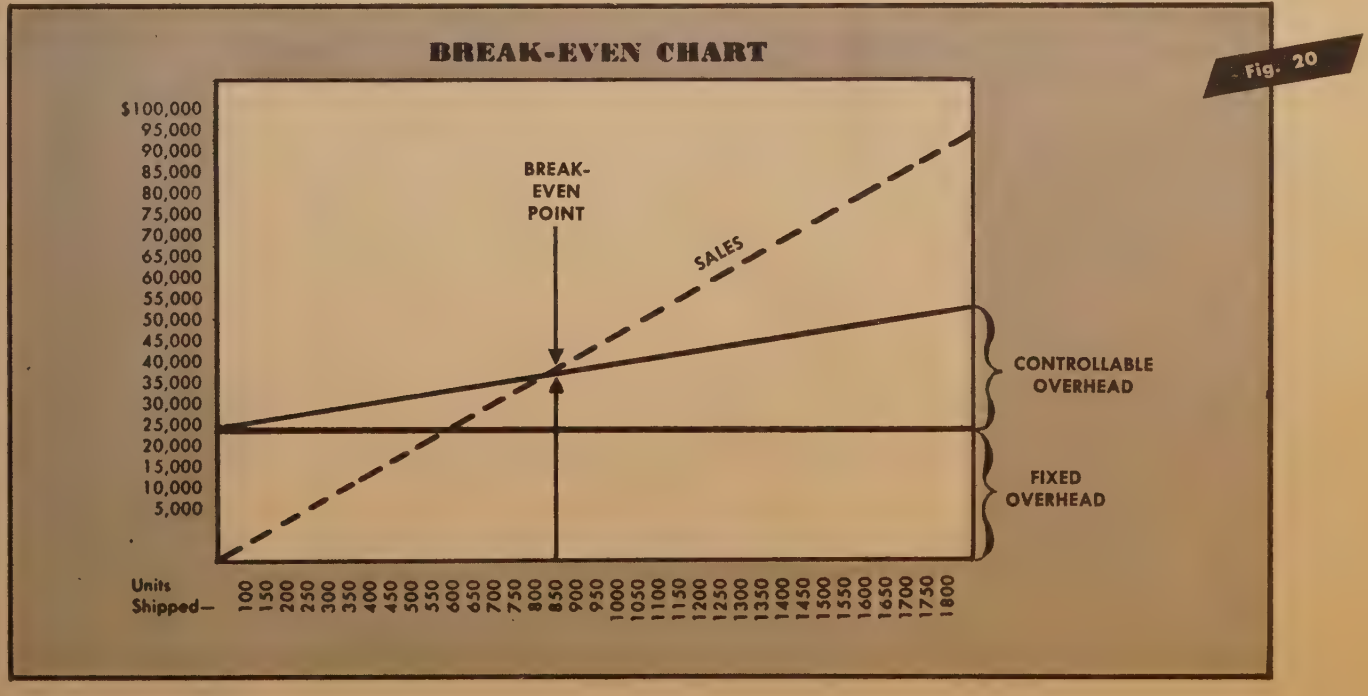
Under the circumstances the above thought made good sense. After all, what did it *really* matter whether a gun cost $50 to complete, or $60? The soldier, who was raring to pull the trigger, had to have the gun and never mind the bookkeeping and the haggling about the price.

Consequently, for quite a while, cost was something in which only the red tape artist engaged, and the production man wanted absolutely no part of it.

However, with the ending of the war and the resumption of civilian production time has caught up with itself. We are now interested in something more than just making an item. We want the best item there is, at the *minimum practicable cost*. Nowadays, the emphasis is on cost control. This is so because low costs are synonymous with efficiency, high costs with waste and improper utilization of man and machine power. Americans always were, and probably always will be, "waste-conscious".

Management's View

With the increasing competition attendant upon resumption of civilian production, it was most important to study and record costs and set up control measures. This inevitable trend toward more effective and complete cost control has been stimulated by experience with negotiation procedures as well as the administration of federal and state income tax regulations. Under both of these conditions costs have had to stand the test of being reasonable.



At various times the fundamentals of cost control and production have been discussed in articles in MILL AND FACTORY. These articles covered the essentials of cost control and cost management, whether in process manufacturing or job order work, under the standard cost system or any other common application of costing methods. They described the cost control tools of shop management.

But what about the foreman? He is a most important part of shop management. Quite often he is the single, most vital, factor in shop management. And, consequently, he has a significant role in cost control. However, he isn't a cost man, doesn't pretend to be, and probably doesn't want to be. As a result, you wouldn't expect the foreman to study specialized discourses on different types of cost systems, and still have him tend to his regular work and give it his best effort.

Inherent in the daily routine of the foreman's work is the fact that he exercises a great deal of control over costs. That's what supervision is for: to see that men and machines are used as efficiently as possible for the jobs at hand and to coordinate the materials flow with the work flow.

However, there is always the question of the human factor, that "added measure", that extra bit of effort that begins to make the difference between merely holding one's own place and going places. Experience proves that a foreman, just like anyone else, will not consistently exert such effort without sooner or later coming to the question: What do I get out of it? What is the inducement? *What's in it for me?*

Forward - looking management recognizes this side of business life in the instant situation, and assures itself of maximum cost control by making it worthwhile to the foreman. It is not only efficient to do so, *it pays off.*

The Break-Even Chart

A good way for management to begin, in setting up a plan for compensating foremen for going out of their way to cut down wastes and to increase efficiency, is to draw a rough picture of the cost facts. That will generally serve as a guide in formulating the bonus plan.

These facts can well be reduced to a break-even chart, sometimes called a profit-point chart. Figure 20 shows such an illustration.

This chart shows the relationship between the money that comes in from sales and the money that goes out through the medium of overhead. Fixed overhead is really just what the name implies. It is "fixed" and there is nothing anyone can do about it. It includes items such as rent, taxes, depreciation, insurance, etc. But variable overhead is controllable in a rather important way, and that is where the foreman comes in. Under a bonus plan, that is where he can do himself justice, bringing down the variable, or controllable overhead line. Obviously, this means an earlier meeting with the sales income line, a quicker arrival at the break-even point, and an earlier realization of profits for the organization.

Controllable Overhead

What constitutes controllable overhead is naturally something that has to be determined from the facts in a set of specific circumstances. What may be controllable overhead in one case may be fixed in quite another, and vice versa.

Still, in order to give some examples of what is *normally* considered controllable overhead we submit the following list:

(1) Idle time
(2) Light
(3) Fuel
(4) Spoilage
(5) Supplies
(6) Repair and upkeep labor
(7) Repair and upkeep materials
(8) General service labor.

The first step in installing the bonus plan, having constructed a break-even chart or otherwise summarized the basic data, is to decide who is to participate in the plan. The foreman, naturally, comes in at the head of the line. Section heads, or assistant foremen, or whatever they might be called, might come under consideration shortly thereafter.

Other employes, also, might logically contribute to the success of the plan and, therefore, they should also be covered. Some examples are: supervisors, inspectors, testers, dispatchers, etc.

Once the "who" is determined, the next question is "how much?". It will be found that the most logical and most practical approach is to set certain arbitrary percentages as a beginning point, and then to discuss them with all the employes concerned. In the end, final agreement will be made on a certain percentage.

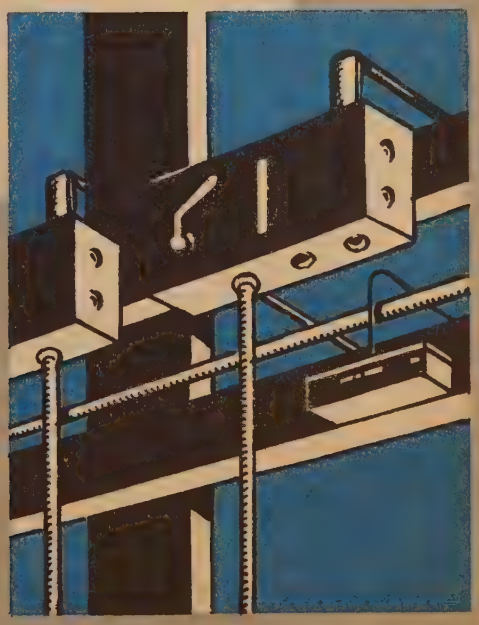
The final question might well be: *How much of what?* The answer is quite simple. The saving achieved in actual outlays for controllable overhead—below a certain standard or budget figure—is the amount to be shared. A typical example of how that may be calculated is given in Figure 21.

The MILL FACTORY
Controllable Overhead Bonus
February, 1946 — **Department 6**

Standard Controllable Overhead				$9,216.40
Actual costs				8,813.72
Cost saving (bonus basis)				$ 402.68
Distributed to:				
a. Direct Participants (40%)			$161.07	
Jones	30%	$48.32		
Smith	20%	32.21		
Brown	20%	32.21		
Grey	20%	32.21		
Allen	10%	16.12		
	100%	$161.07		
b. Indirect Participants (40%)			$161.07	
Huber	20%	$32.21		
Brady	20%	32.21		
Gilbert	10%	16.11		
Tompkins	10%	16.11		
Burke	10%	16.11		
Wells	10%	16.11		
Simmons	10%	16.11		
Schulman	10%	16.10		
c. Company (20%)		$161.07	$ 80.54	$402.68
Total (per above)				

Fig. 21

MAINTENANCE OF INDUSTRIAL WIRING



MARCH 1947

MILL & FACTORY MAINTENANCE MANUAL No. 19

Maintenance of

INDUSTRIAL WIRING AND DISTRIBUTION LINES

Electricity is used extensively in most industrial plants for purposes of light and power. Heating, drying, testing and welding are some of the other operations commonly performed by electrical means. These general fields of application cover innumerable different processes and services in the modern mill and factory.

Suitable electric current, which is usually obtained from some bulk source, must reach each light, motor, welder, heater, dryer, instrument and other devices which operate on electricity in order that the plant may function successfully. It is the distribution system that receives the electricity in bulk and delivers it to the various machines, lights and other apparatus that utilize it.

The successful functioning of many pieces of processing and maintenance equipment, and of the plant at large, therefore, depends upon the effectiveness of the current distribution.

To attain as perfect a performance as possible from the electrical system, careful attention should be paid to the practical, adequate design of the system; the selection of efficient equipment from reliable and experienced manufacturers; the correct installation of the apparatus and devices; and the practice of proper preventive maintenance procedures.

It is, of course, the province of an electrical engineer or other electrical expert to design, select and install the best system and equipment for the original job. But it is commonly up to the electrical men in the maintenance department to see that the installation continues to operate efficiently and economically and to make adjustments for rearrangements in equipment layout as well.

Proper maintenance of the distribution system contributes to the satisfactory operation of the plant. And low maintenance and operating costs, with a corresponding improvement in quality of service, are possible, too, if a good, safe and adequate system has been installed.

IMPORTANT INSTALLATION FACTORS

Some of the important fundamentals to be considered in connection with the original installation, and in the making of changes and extensions thereto, are as follows:

POWER SUPPLY — characteristics, location in relation to buildings and equipment, convenient service entrances.

ELECTRICAL EQUIPMENT — characteristics, types of loads, proper consideration regarding efficient operation and easy accessibility for inspection and maintenance, ventilation, safety factors, service reliability.

PROPER VOLTAGES — requirements of individual motors and other units of the power system and the separate needs of the lighting circuits.

DISTRIBUTION SYSTEM — basic needs, efficient design, area to be covered, sufficient and economical locations of distribution centers, as short circuits from distribution centers as possible, provisions for enlargement and shifting of equipment.

WIRING — use of approved methods and devices, conductors of sufficient current-carrying capacities, adherence to the National Electrical Code and to local codes and regulations.

Industrial Wiring

DISTRIBUTION SYSTEMS

As already noted, it is the function of the distribution system to carry the current from the service entrance or the switchboard to each device, machine or other piece of equipment that uses electricity.

Distribution systems, therefore, comprise far more than the wire and cable. They include conduits, tubing, raceways, wireways, busways, switchboards, panelboards, control and protective equipment, cabinets, transformers, capacitors, junction boxes, cutout boxes, insulators, supports, wiring devices, accessory fittings and other items.

Accessory fittings for outlet boxes, for example, consist of connectors, bushings, couplings, elbows, lock nuts, reducers, enlargers, etc.

Wiring devices comprise switches, outlets, caps, plugs, connectors, attachment plugs, lamp sockets and the like.

MAINTENANCE OF DISTRIBUTION SYSTEMS

The upkeep of the distribution equipment and devices is as important to the success of the electrical system as the original selection of the right kind of apparatus.

As previously said, one of the best ways to keep down maintenance costs is to select well-designed equipment. For low-cost maintenance it is also necessary that the apparatus be installed properly. Accessibility of vulnerable parts is another important element.

Switchboards, circuit breakers, busways, and other similar distribution items should be located where they are not subject to accumulations of dirt, dust, lint, etc., or too close to travel lanes where they would be subject to damage from pedestrian traffic, industrial trucks, cranes and other vehicles, or where exposed to corrosive and moist atmospheric conditions.

General maintenance practices for distribution systems require periodic and systematic inspections. Some of the conditions to be looked for are as follows:

a. **Exposed live parts and other potential danger spots.**
b. **Mechanical damage to, and lack of proper protection of, conductors and their insulation.**
c. **Subjection of conductors to damage because of location along traffic aisles and adjacent to heavy work areas.**
d. **Presence of moisture, condensation, chemical fumes and other detrimental conditions.**
e. **Freedom from vibration.**
f. **Loose, dirty, damaged or improperly made connections.**
g. **Proper ventilation of all devices.**
h. **Faulty grounding arrangements.**
i. **Heating from circuit overloading and from external sources of heat.**

INSPECTIONS

If inspections of all cables and wire circuits, connections and fittings have not been made for some time, a complete thorough examination of the system should be undertaken. Subsequent inspections should be made as often as necessary — intervals of from six to twelve months may prove sufficient depending upon local conditions.

Either repair or replace damaged materials and devices immediately. In many cases it will be found that replacements are less costly in the end than the making of repairs.

An electrical maintenance shop should be equipped with all the necessary meters and other measuring and testing apparatus, soldering tools, insulation strippers, pipe cutting and threading tools and other essential supplies and equipment. The amount of such apparatus depends, of course, upon the size and type of the electrical installations in the plant.

This manual will deal primarily with the industrial wiring methods and materials.

SAFE PROCEDURES

Safety is a most important consideration in all electrical work. Fundamental requirements for safe procedures with respect to electrical installations are set forth in the National Electrical Code (NEC). This Code is prepared by the Electrical Committee of the National Fire Protection Association (NFPA) which "acts as sponsor for the project under the rules of procedure of the American Standards Association."

This Code meets the requirements of the National Board of Fire Underwriters and is endorsed by such national organizations as those mentioned below and others.

The new 1947 edition of National Electrical Code was recently published and is now available. It may be obtained from the National Fire Protection Association, Boston, Mass., or from the various offices of the National Board of Fire Underwriters.

Adopted by the NFPA at its 1946 annual convention, this new Code supersedes the 1940 NEC and its amendments. The American Standards Association has also accepted it as an American Standard.

Because of the extreme importance of the Code, and the opportune timeliness of the current issue of the new 1947 Code, considerable reference is made to it in this Manual and valuable data used from it. Obviously only a few sections of the Code can be given here. Reference, therefore, to the complete Code should be made in all cases in order to provide safe installations. All qualified electrical workers in the maintenance department should be familiar with the complete Code.

In some areas local laws may vary slightly from the NEC in some details. In all instances, therefore, local codes and regulations should be consulted for any such variations.

Organizations which supply helpful and reliable information on the selection, installation, operation and care of electrical apparatus of all kinds include such bodies as the American Institute of Electrical Engineers, Edison Electric Institute, National Electrical Manufacturers Association, American Standards Association, Illuminating Engineering Society, National Electrical Contractors Association and the electrical groups and committees of the National Fire Protection Association, National Board of Fire Underwriters and the Associated Factory Mutual Fire Insurance Companies.

ADEQUATE ELECTRIC WIRING

The Industry Committee on Interior Wiring Design has made studies regarding the essentials of interior wiring to provide adequate and efficient service. While safety is naturally paramount, other factors such as economy and flexibility are also considered.

Each plant, of course, has its individual problems that require special study. Regardless of this point, there are several elements which are of importance in an industrial plant of any considerable size.

In general, a power wiring installation for example may be regarded as adequate when the following elements have been given proper consideration:

Safety and reliability
Avoidance of excessive voltage drops and copper losses
Flexibility for changing locations of equipment
Provisions for supplying increased loads.

Safety and reliability can be attained by observing the National Electrical Code standards — for example, the matter of conductor sizes is most important.

Between the service entrance and any motor, the voltage should not be allowed to drop more than 5 per cent. Maintenance of this feature will help to insure satisfactory operations.

Since in most plants the changing of motor locations is a common occurrence, proper provisions should be made for probable shifts of equipment. This element of flexibility may be obtained by means of wireways which carry feeders and motor branch circuits; busways which have arrangements for plugging-in devices; over-size raceways which anticipate changes in motor sizes; and, if the building is suited to them, under-floor raceways which can supply current to a large number of small motors.

The supplying of increased loads may be provided for by making the service equipment feeders and sub-feeders large enough to allow for some excess capacity. Another point to observe is that the raceways and other equipment are large enough to allow for the installation of any conductors that may be needed to provide an increase in capacity.

Still another valuable measure is the use of sectional types of panelboards with interchangeable units, so that control units of larger ratings may be installed. Distribution centers should be so designed that the control of additional equipment is possible.

FOR SAFE, LOW-COST MAINTENANCE — SELECT THE RIGHT MATERIAL AND METHOD

WIRING METHODS AND MATERIALS

The 1947 edition of the National Electrical Code has been published as a special cloth-bound book designated as Volume V of the National Fire Codes. Chapter 3 is titled "Wiring Methods and Materials."

Article 300 of this Chapter gives the general requirements for wiring. Article 310 covers conductors and will be presented complete below.

The conductors normally used to carry current are of copper unless otherwise provided in the Code. Conductor sizes in the Code apply, therefore, to copper. If other materials are used, the sizes are changed accordingly. Section 3106 of Article 310, for instance, notes such variation.

Conductors — Article 310 NEC

General (3101).— The intent and purpose of the following rules is to provide that conductors shall have mechanical strength, insulation, and carrying capacity adequate for the particular conditions under which they are to be used.

The provisions of this article are not intended to apply to conductors which form an integral part of equipment such as motors, motor controllers, and the like, or which are provided for elsewhere in this code.

Conductor Insulation (3102).—Conductors shall be insulated, except when uninsulated conductors are specifically permitted in this code. Conductor insulations as

specified in the accompanying table may be used for any of the wiring methods recognized in this chapter, except as otherwise provided for in the table or the notes following or as otherwise specified in this code. They are suitable for 600 volts unless otherwise specified.

(a) **Temperature Limitations.** No conductor shall be used under such conditions that its temperature, even when carrying current, will exceed the temperature specified in the table for the type of insulation involved.

(b) **Wet Locations.** Insulated conductors used underground, in concrete slabs or other masonry in direct contact with earth, in wet locations, or where condensation or accumulation of moisture within the raceway is likely to occur, shall be moisture-resistant, rubber-covered (type RW); moisture-resistant, thermoplastic-covered (type TW); lead-covered; or of a type approved for the purpose.

Such conductors are not suitable for direct burial in the earth unless of a type specifically approved for the purpose.

(c) **Corrosive Conditions.** Conductors exposed to oils, greases, vapors, gases, fumes, liquids or other substances having a deleterious effect upon the conductor or insulation shall be of a type approved for the purpose.

Minimum Size of Conductors (3103).— Conductors, whether solid or stranded, shall not be smaller than No. 14, except for printing press control circuits; as provided for flexible cords in section 4006; for fixture wire in section 4142; for fractional horsepower motors in section

CONDUCTOR INSULATION

The rubber insulations include those made from natural and synthetic rubber, neoprene and other vulcanizable materials.
Thermoplastic insulation may stiffen at temperatures below minus 10°C (14°F) and care should be used in its installation at such temperatures.
For size of conductors recognized for the various insulating coverings, and for construction details, see section 9310.

TRADE NAME	TYPE LETTER	MAX. OPERATING TEMP.	SPECIAL PROVISIONS
Rubber-Covered Fixture Wire	RF-64	60C 140F	Fixture wiring. Limited to 300 V.
Solid or Stranded	RF-32	60C 140F	Fixture wiring, and as permitted in section 3103.
Rubber-Covered Fixture Wire	FF-64	60C 140F	Fixture wiring. Limited to 300 V.
Flexible Stranded	FF-32	60C 140F	Fixture wiring.
Thermoplastic-Covered Fixture Wire—Solid or Stranded	TF	60C 140F	Fixture wiring, and as permitted in section 3103.
Thermoplastic-Covered Fixture Wire—Flexible Stranding	TFF	60C 140F	Fixture wiring.
Cotton-Covered, Heat-Resistant Fixture Wire	CF	90C 194F.	Fixture wiring. Limited to 300 V.
Asbestos-Covered Heat-Resistant Fixture Wire	AF	125C 257F	Fixture wiring. Limited to 300 V.
Code Rubber	R	60C 140F	General use.
Heat-Resistant Rubber	RH	75C 167F	General use.
Moisture-Resistant Rubber	RW	60C 140F	General use and wet locations.
Latex Rubber	RU	60C 140F	General use.
Thermoplastic	T	60C 140F	General use. No. 14 to 4/0 inclusive. Open work No. 14 to 2,000,000 C.M.
Moisture-Resistant Thermoplastic	TW	60C 140F	General use and wet locations. No. 14 to 4/0 inclusive. Open work No. 14 to 2,000,000 C.M.
Thermoplastic and Asbestos	TA	90C 194F	Switchboard wiring only.
Varnished Cambric	V	85C 185F	Dry locations only. Smaller than No. 6 by special permission.
Asbestos and Varnished Cambric	AVA	110C 230F	Dry locations only.
Asbestos and Varnished Cambric	AVL	110C 230F	Wet locations.
Asbestos and Varnished Cambric	AVB	90C 194F	Dry locations only.
Asbestos	A	200C 392F	Dry locations only. Not for general use. In raceways, only for leads to or within apparatus. Limited to 300 V.
Asbestos	AA	200C 392F	Dry locations only. Open wiring. Not for general use. In raceways, only for leads to or within apparatus. Limited to 300 V.
Asbestos	AI	125C 257F	Dry locations only. Not for general use. In raceways, only for leads to or within apparatus. Limited to 300 V.
Asbestos	AIA	125C 257F	Dry locations only. Open wiring. Not for general use. In raceways, only for leads to or within apparatus.
Paper		85C 185F	For underground service conductors, or by special permission.
Slow-Burning	SB	90C 194F	Dry locations only. Open wiring; and in raceways where temperatures will exceed those permitted for rubber-covered or varnished cambric-covered conductors.
Slow-Burning Weatherproof	SBW	90C 194F	Dry locations only. Open wiring only.
Weatherproof	WP	80C 176F	Open wiring by special permission where other insulations are not suitable for existing conditions.

4312; for cranes and hoists in section 6112; for elevator control and signal circuits in section 6205; for machine tools in section 6721; and for remote-control, low-energy power and signal circuits in section 7263.

Stranded Conductors (3104).— Except when used as busbars, conductors No. 6 and larger, installed in raceways, shall be stranded.

Conductors in Multiple (3105).— Conductors in sizes 1/0 to 500,000 c.m., inclusive, may be run in multiple provided they are of the same length and have the same circular-mil area and type of insulation. Not more than three No. 1/0, four No. 2/0 nor five Nos. 3/0 to 500,000 c.m. conductors, inclusive, may be run in multiple. Except as herein provided, conductors shall be run in multiple only by special permission or as permitted, in section 6205. Where conductors are run in multiple, they shall be arranged and terminate at both ends in such a manner as to insure equal division of the total current between all conductors that are involved.

Current-Carrying Capacity (3106).— The maximum, continuous, current-carrying capacities of copper conductors are given in Tables 1, 2 and 3 of Chapter 10. [Tables 1 and 2 are reproduced on pages 6 and 7, and Table 3 on page 8, of this Manual.] The current-carrying capacities of aluminum conductors shall be taken as 84 per cent of those given for the same sizes of copper conductors with the same kind of insulation.

TABLE 1 — ALLOWABLE CURRENT-CARRYING CAPACITIES OF CONDUCTORS IN AMPERES

Not More Than Three Conductors in Raceway or Cable
(Based on Room Temperature of 30 C. 86 F.)

Size AWG MCM	Rubber Type R Type RW Type RU Type T Type TW	Rubber Type RH	Copper Thermoplastic Asbestos Type TA Varnished Type V Asbestos Varnished Type AVB	Asbestos Varnished Type AVA Type AVL	Impregnated Asbestos Type AI Type AIA	Asbestos Type A
14	15	15	25	30	30	30
12	20	20	30	35	40	40
10	30	30	40	45	50	55
8	40	45	50	60	65	70
6	55	65	70	80	85	95
4	70	85	90	105	115	120
3	80	100	105	120	130	145
2	95	115	120	135	145	165
1	110	130	140	160	170	190
0	125	150	155	190	200	225
00	145	175	185	215	230	250
000	165	200	210	245	265	285
0000	195	230	235	275	310	340
250	215	255	270	315	335	
300	240	285	300	345	380	
350	260	310	325	390	420	
400	280	335	360	420	450	
500	320	380	405	470	500	
600	355	420	455	525	545	
700	385	460	490	560	600	
750	400	475	500	580	620	
800	410	490	515	600	640	
900	435	520	555			
1,000	455	545	585	680	730	
1,250	495	590	645			
1,500	520	625	700	785		
1,750	545	650	735			
2,000	560	665	775	840		

Correction Factor for Room Temperatures Over 30 C. 86 F.

C	F					
30	104	.87	.88	.90	.94	.95
35	113	.71	.82	.85	.90	.92
40	122	.58	.75	.80	.87	.89
45	131	.41	.67	.74	.83	.86
60	140		.58	.67	.79	.83	.91
70	158		.35	.52	.71	.76	.87
75	167			.43	.66	.72	.86
80	176			.30	.61	.69	.84
90	194				.50	.61	.80
100	212					.51	.77
120	248						.69
140	284						.59

MAINTENANCE OF WIRING SYSTEMS

The best method for preventing failures in the wiring system is to inspect all cables and wires periodically. Some of the procedures given earlier in the Manual apply to the wiring arrangements. More detailed checks are given here.

The need for inspecting the wiring circuits depends to a large extent upon the amount of use to which they are subjected — the more continuous use, naturally the more frequent the inspections.

Frequently troubles come from sockets and cords. An essential to low-cost maintenance then is the original installation of good quality wire, devices and fittings, as it is with all other electrical equipment.

PROPER INSPECTIONS PREVENT TROUBLES

LOOK FOR DAMAGE TO CONDUCTORS BECAUSE OF —	PREVENTIVE MAINTENANCE PRACTICE
Exposed locations (along passage and traffic aisles, near heavy work areas, etc.)	Provide suitable protection for cables.
Abrasion of cable at end of conduit	Protect cable with insulated bushing, or with tape or rubber pad.
Carelessness of workers	Instruct men to watch out for nearby cables; also not to hang clothes or tools on cables.
Tools, rocks, etc., falling on cable	Bury cable for protection.
Exposure of cable braid to weather	Apply weatherproof paint to prevent drying out.
Swelling and softening of rubber-insulated cables from oil	Protect cables where exposed to dripping oil (cutting oils, etc.), or where in contact with it.
Fire in one circuit or cable spreading to another	Apply fireproof cement or tape to short lengths; install fire barriers; protect circuits so they open quickly when shorts occur.
Failure to ground from lightning surge on cable connected to overhead line	Check size and rating of lightning arresters. Connect arrester ground lead to cable sheath.

Industrial Wiring

Other wiring methods and materials approved by the Code and for which safety procedures are specified in Chapter 3 are as follows:

- Open Wiring on Insulators
- Concealed Knob-and-Tube Work
- Bare Conductor Feeders
- Armored Cable
- Non-Metallic Sheathed Cable
- Service-Entrance Cable
- Non-Metallic Waterproof Wiring
- Non-Metallic Surface Extensions
- Underplaster Extensions
- Rigid Metal Conduit
- Electrical Metallic Tubing
- Flexible Metal Conduit
- Surface Metal Raceway
- Underfloor Raceway
- Cellular Metal Floor Raceways
- Wireways
- Busways
- Outlet, Switch and Junction Boxes, and Fittings
- Cabinets and Cutout Boxes
- Auxiliary Gutters
- Switches
- Switchboards and Panelboards

HAZARDOUS LOCATIONS

The provisions of Article 500 of the NEC apply to locations which are considered hazardous.

More than ordinary care should be exercised, therefore, with regard to the installation, operation and maintenance of equipment to insure safe performance.

CLASS I LOCATIONS

Those in which flammable gases or vapors are or may be present in the air in quantities sufficient to produce explosive or ignitible mixtures.

CLASS II LOCATIONS

Those which are hazardous because of the presence of combustible dust.

CLASS III LOCATIONS

Those which are hazardous because of the presence of easily ignitible fibers or flyings, but in which such fibers or flyings are not likely to be in suspension in air in quantities sufficient to produce ignitible mixtures.

OVERHEATING

Excessive over heating from overloading and the presence of external sources of heat is one of the most serious and common causes of damage to insulation. To check overloads, hook-on ammeters may be used, thus making it unnecessary to disturb connections. To determine cable overheating, appropriate temperature registering or measuring methods are usually suitable.

CABLE LOCATION	CAUSE OF OVERHEATING
All Installations	High current from: Low power factor equipment. Low voltage at receiving end. Unbalanced currents from: Unbalanced loading of phases. Arrangement of single conductor cables in group.
In Racks Vertically	Heat rising from lower cables.
Horizontally	Mutual heating.
Closely spaced or near ceiling	Confining of heat.
External heating	Adjacent sources of heat or poor ventilation or sheathing.
In Tunnels	Overloading. Spacing too close. Inadequate air circulation or insufficient insulation from external heat source.
In Underground ducts	Overloading. Inadequate ventilation.
Aerial Cables	Overloading. Improper shading from sun.
Cable risers	Exposure to sun. Heated air rising to top of conduit.

SUPPLEMENTARY INFORMATION

Several maintenance manuals on other items of electrical equipment have previously been issued. Those that may be of additional help are as follows:

ELECTRIC HOISTS — MAINTENANCE MANUAL NO. 1

ELECTRIC MOTORS — MAINTENANCE MANUAL NO. 3

LIGHTING EQUIPMENT — MAINTENANCE MANUAL NO. 5

PORTABLE ELECTRIC TOOLS — MAINTENANCE MANUAL NO. 7

INDUSTRIAL POWER TRUCKS — MAINTENANCE MANUAL NO. 8

ELECTRIC CONTROLS — MAINTENANCE MANUAL NO. 12

TABLE 2 — ALLOWABLE CURRENT-CARRYING CAPACITIES OF CONDUCTORS IN AMPERES

Single Conductor in Free Air
(Based on Room Temperature of 30 C. 86 F.)

Size AWG MCM	Rubber Type R Type RW Type SV (14—6) Thermoplastic Type T Type TW	Rubber Type RH (14—6) Type RH Thermoplastic Type T Type TW	Thermoplastic Asbestos Type TA Varnished Cambric Type V Asbestos Varnished Cambric Type AVA	Asbestos Varnished Cambric Type AVA Type AVL	Impregnated Asbestos Type A1 (14—6) Type AA	Asbestos Type A (14—6) Type AA	Slow-burning Type SB Weatherproof Type WP Type WPB
14	20	20	30	40	40	45	30
12	25	25	40	50	50	55	40
10	40	40	55	65	70	75	55
8	55	65	70	85	90	100	70
6	80	95	100	120	125	135	100
4	105	125	135	160	170	180	130
3	120	145	155	180	195	210	150
2	140	170	180	210	225	240	175
1	165	195	210	245	265	280	205
0	195	230	245	285	305	325	235
00	225	265	285	330	355	370	275
000	260	310	330	385	410	430	320
0000	300	360	385	445	475	510	370
250	340	405	425	495	530		410
300	375	445	480	555	590		460
350	420	505	530	610	655		510
400	455	545	575	665	710		555
500	515	620	660	765	815		630
600	575	690	740	855	910		710
700	630	755	815	940	1,005		780
750	655	785	845	980	1,045		810
800	680	815	880	1,020	1,085		845
900	730	870	940				905
1,000	780	935	1,000	1,165	1,240		965
1,250	890	1,065	1,130				
1,500	980	1,175	1,260	1,450			1,215
1,750	1,070	1,280	1,370				
2,000	1,155	1,385	1,470	1,715			1,405

Correction Factor for Room Temperatures Over 30 C. 86 F.

C	F						
40	104	.82	.88	.90	.94	.95	
45	113	.71	.82	.85	.90	.92	
50	122	.58	.75	.80	.87	.89	
55	131	.41	.67	.74	.83	.86	
60	140		.58	.67	.79	.83	.91
70	158		.35	.52	.71	.76	.87
75	167			.43	.66	.72	.86
80	176			.30	.61	.69	.84
90	194				.50	.61	.80
100	212					.51	.73
120	248						.69
140	284						.57

SPLICES, JOINTS AND TAPS

Among the provisions in the new 1947 NEC regarding splices and joints are the following:

Article 110 — General, Section 1118. Splices. Conductors shall be so spliced or joined as to be mechanically and electrically secure without solder and, unless an approved splicing device is used, shall then be soldered with a fusible metal or alloy or brazed or welded. All splices and joints and the free ends of conductors shall be covered with an insulation equal to that of the conductors.

Article 300 — General Requirements for Wiring Methods, Section 3005. Runs Continuous. Raceways and cable assemblies shall be continuous from outlet to outlet and from fitting to fitting. Conductors shall be continuous from outlet to outlet and, except as permitted for auxiliary gutters in section 3748, and for wireways in section 3625, there shall be no splice or tap within the raceway itself.

Splices and taps in underfloor raceways shall be made only in junction boxes. In cellular metal floor raceways, they shall be made only in header access units or junction boxes.

Article 362 — Wireways, Section 3625. Splices and Taps. Splices or taps, made and insulated by approved methods, may be located within the wireway if they are accessible by means of hinged covers. The conductors, including splices and taps, shall not fill the wireway to more than 75 per cent of its area.

According to the NEC, "Flexible cord shall be used only in continuous lengths without splice or tap."

The other provisions in the Code concerning splices, joints and taps should also be observed.

FLEXIBLE CORDS

The conditions of use and location of flexible cords are given in Article 400 of the 1947 National Electrical Code.

Types and trade names of suitable cords are listed in an accompanying table. Current carrying capacities of flexible cords, as recognized by the NEC, are given in Table 3.

The minimum size for flexible cords is No. 18, except that tinsel cords, or cords having equivalent characteristics, of smaller size may be approved for use with specific appliances.

If the voltage between two conductors exceeds 300, but is not over 600, "flexible cord of No. 10 and smaller shall have rubber or thermoplastic insulation on the individual conductors at least 3/64 inch in thickness, unless type S, SO or ST cord is used."

Trade Names and Type Letters of Flexible Cords Approved by the NEC

Asbestos Covered Tinsel Cord—AT
Cotton Covered Tinsel Cord—CT
Rubber Jacketed Tinsel Cord—ATJ, CTJ
Asbestos Covered Heat Resistant Cord—AFC, AFPO, AFPD
Cotton Covered Heat Resistant Cord—CFC, CFPO, CFPD
Parallel Cord—PO-64, PO-32, PO
All Rubber Parallel Cord—POSJ-64, POSJ-32
All Plastic Parallel Cord—POT-64, POT-32
Lamp Cord—C
Armored Cord—CA
Twisted Portable Cord—PD
Reinforced Cord—P-64, P-32, P
Moisture Proof Reinforced Cord—PWP-64, PWP-32, PWP
Braided Heavy Duty Cord—K
Vacuum Cleaner Cord—SV, SVT
Junior Hard Service Cord—SJ, SJO, SJT
Hard Service Cord—S, SO, ST
Rubber Jacketed Heat Resistant Cord—ASFJ, AFS
Heater Cord—HC, HPD
Rubber Jacketed Heater Cord—HSJ
Heat and Moisture Resistant Cord—AVPO, AVPD
Elevator Cable—E, EO

TABLE 3 — ALLOWABLE CURRENT-CARRYING CAPACITY OF FLEXIBLE CORD IN AMPERES

(Based on Room Temperature of 30 C, 86 F.)

Size AWG	Rubber and Cotton Types CT, CTJ Rubber and Asbestos Types AT, ATJ	Rubber Types PD, C, PO, P, PWP, K, S, SO Armored Type CA	Rubber Types [illegible] plastic Types ST, SJT, SVT, POT	Types AFS, AFSJ, HC, HPD, HSJ	Types AVPO, AVPD	Cotton Types CFC*, CFPO*, CFPD* Asbestos Types AFC*, AFPO*, AFPD*
27**	0.5					
18		5	7	10	17	6
17				12		
16		7	10	15	22	8
15				17		
14		15	15	20	28	17
12		20	20		36	
10		25	25		47	
8		35				
6		45				
4		60				
2		80				

*These types are used almost exclusively in fixtures where they are exposed to high temperatures and ampere ratings are assigned accordingly.

**Tinsel cord.

USE FLEXIBLE CORDS FOR—

a. Pendants
b. Wiring of fixtures
c. Connection of portable lamps or appliances
d. Elevator cables
e. Wiring of cranes and hoists
f. Connection of stationary equipment to facilitate their interchange
g. Preventing the transmission of noise or vibration

DO NOT USE FLEXIBLE CORDS—

a. As a substitute for the fixed wiring of a structure
b. Where run through holes in walls, ceilings or floors
c. Where run through doorways, windows or similar openings
d. Where attached to building surfaces
e. Where concealed behind building walls, ceilings or floors

Keep a complete set of these useful Maintenance Manuals in your file. Reprints may be obtained by sending 10c each to MILL & FACTORY, 205 East 42nd St., New York 17, N. Y. Special permanent binders will be supplied for $1.50 extra.

The proper belt can often solve a tool drive problem.

Selecting Belts to Fit the Problem

By Edwin Laird Cady

IN the old days when nearly every machine was driven by flat, round or V-Belts there was a great deal of "tailor making" of belts for individual drives.

The great bulk of belts in any factory would be of standard types and sizes bought by the roll and fastened or made endless to length for standard drives. But where there was a mule drive, a severe crossed belt drive or some difficult condition of shock loading the belts would be especially cut from side stock, or a double belt would be made from two entirely different leathers, or some other special design would be worked out to serve that peculiar purpose.

Some of this is still done, as the belting factories and "belt lofts" to be found in all large industrial cities can testify. And much of it still is needed. But there now are so many different belts and pulleys available on the open market that the majority of problems can be solved by skillful selection from them.

Better still, quite a few of the standard drives could be improved by better selecting of belts. More than one production manager is considering the installation of costly direct drives or other "belting eliminators" when his problems could be solved more effectively with no capital investment by more skillful selection of belts. And there are plenty of machines whose present rates and qualities of output are accepted

BRIEFED—By the proper selection of belt drives, many transmission problems of a special nature, such as shock loads, time lags and overloads, can be solved without the application of more complicated equipment. The wide variety of belts on the present day power transmission market, give the engineer an extensive choice of selection.

shock loads on a carbide tool which is to cut interrupted surfaces at high speeds is, of course, a severe test of such engineering.

More common problems are those of high speed saws, of piston pumps and other reciprocating mechanisms, of tumbling barrels, of drop hammers, of punch presses and of looms. In all of these application engineering of carefully selected belts is paying profits.

Time Lags and Overloads

The answer to the question of what ought to occur in a power transmission sequence when the driven mechanism is overloaded varies with every mechanism.

There are applications in which the power delivery should cease abruptly, as would happen with the breaking of a safety shear pin mounted in the transmission sequence or with the blowing of a highly sensitive fuse or the opening of a circuit breaker. In other applications the overload is so likely to be temporary and of no harm that there should be a time lag before the delivery of power stops. Depending upon the driven mechanism and the work which it does, that time lag may need to be accompanied by a temporary increase of power, a temporary decrease, a temporary decrease of speed, or by maintained uniformity of both power and speed.

The ideal solution of such a problem very often is a specially selected or designed electric motor having exactly the desired characteristics and being governed by exactly the right electrical mechanisms. Unfortunately, such specially designed electrical equipment is very difficult to obtain in today's market. As the motor makers continue to press toward the selling of fewer designs and sizes and more benefit from the mass production of standard lines, the special application motors may become still more difficult to obtain. Moreover, very often the special electrical hook up, while it is the engineeringly ideal solution, is not the most economically profitable one.

Competently engineered belt drives which make use of carefully selected belts can solve many of these problems with the highest obtainable financial economy.

Where the shut off of power needs to be abrupt the belt and its pulleys can be so selected that the belt slippage is almost instantaneous and is accompanied by very little further delivery of power at the overload point. Different beltings vary widely, even though dependably, in the amounts of power which they will still deliver after they have started to slip, and they may be selected accordingly. Beltings also differ in their characteristics of picking up full load again after the overload condition under which they were slipping has passed.

The breakage of shear pins in the power transmission sequence often is accompanied by the danger of various parts of the mechanism overrunning at the sudden release of forces, or back lashing, or otherwise "running wild." Belt drives can be so designed that they will cushion these shocks and prevent damage to equipment and to work in process and to human beings.

Where the overload should be accompanied by a temporary increase of power or of speed, that increase has to come from the motor, it cannot come from the power transmission sequence. Motors rarely respond instantaneously; they need time to pick up power and speed. Belt drives can be so designed that by slight elastic stretches under load they give the motors a little more time. And this factor is subject to close control.

Belt drives can be used in connection with clutches, with spring loadings, with automatic self-adjusting variable speed mechanisms, and with automatic reversing devices, to solve the problems of overloads and time lags. In most of these cases the belt drive is the most easily engineered member of the sequence; the member which is most easily adaptable to the needs of all the others.

Electrical Conditions

Different beltings range from very poor conductors of electricity to fairly good conductors. Some are poor conductors when dry but are hygroscopic and can become better conductors when moist.

This factor can be very important on modern industrial equipment where more electrical devices are being applied to almost everything.

Belts which are good conductors can solve some static electricity problems. In factories which process powdered products such belts can reduce the explosion hazards. In mechanisms processing such static-prone materials as cork and paper and fabrics these belts can reduce the troubles of bits of material clinging to each other.

Beltings often are specially selected for their known electrical properties when power must be transmitted or materials handled in close proximity to induction heaters. Here the electrical circuits must be closely balanced against known conditions which exist at the inductors or coils.

High-cycle high-potential electrical equipment is becoming more common in all types of industries from chemicals plants and other process industries to machine shops. The electrical characteristics of any equipment parts in close proximity to such equipment, and especially of parts adjacent to or located between the leads, are very important. Belt drives are highly applicable for power transmission in such locations, providing that the belts are carefully selected.

Special Conditions

Belts have long been known for their wide and easy applicability to power transmission problems which no other means can handle so readily. They will find more such applications. In many of these places it will still be practical to substitute one kind of belting for another without noticing much difference in the performance of the driven machine or in shop economy.

Where there are special conditions of exact control of power at the point of work, and of shock loading, heat, oil, abrasiveness, hygroscopic dryness, water, moisture, cramped working space, inaccessability for maintenance, chemicals, exposure to extreme cold, and the like, the belting must be selected with especial care.

Equipment cleanliness is a case in point. In increasing numbers of plants the equipment must be washed down with detergents and with water to comply with sanitation rules, to get rid of bacteria which can cause process troubles; to eliminate waste products which can generate toxic gases; and even to salvage valuable raw materials. Belt drives equipped with properly selected belts can be washed without danger or trouble. If preferred, properly engineered short center drives can be totally encased so that only the exteriors of their cases need be cleaned.

Belts which are to have exact properties to meet exact conditions must be exactly selected and maintained. The necessary beltings are available with widely varied combinations of closely controlled properties. But they cannot be engineered nor maintained with the offhanded carelessness which, indeed, has been the worst enemy of all belt drives for the past forty years.

PRACTICAL Short Cuts and Kinks

Production-speeding ideas and methods, and workable suggestions that save time, toil, materials, and money — Contributed by employes, companies, and government agencies.

LONG-LASTING LIGHT-WEIGHT DOUBLE-SWING DOOR

LONG-LASTING LIGHT-WEIGHT DOUBLE-SWING DOORS

The accompanying illustration shows a pair of light-weight double-swing doors which have given excellent service and outlasted any other type of door where electric truck traffic is quite heavy.

The doors are made up from ¾" thick 5 ply Marine Harboard finished on both sides with the bottom half covered with sheet steel. The ⅛" thick sheet steel is attached to the harboard by flat rivets. The sheets are cut on a bias and the rivet holes are countersunk. The steel sheets cover the bottom four feet of the door to provide protection from heavy traffic.

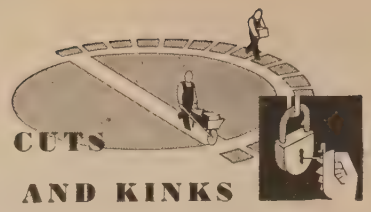
Three pairs of heavy-duty double-acting hinges are used to insure long life. The doors are suitably mounted in the frame.

Five feet up from the floor are two 12" square openings into which are fitted pieces of 3/16" thick clear plastic to provide visibility from one side of the doors to the other.

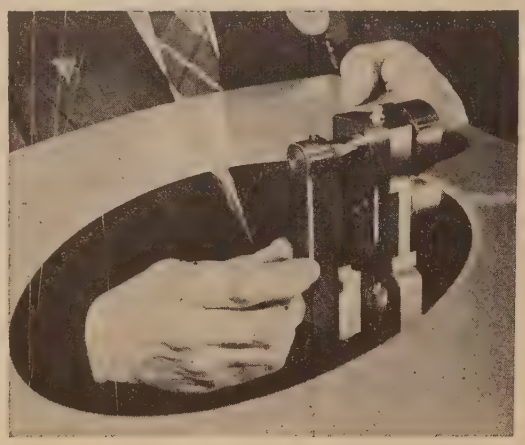
In the past massive plant doors sheathed with steel, light-weight pipe frames and sheet doors and doors with spring bumpers on them have been tried but none proved satisfactory.

The doors described here have been in use for over a year and are still in excellent condition, according to R. P. Ormsbee, Works Engineering Department, Electrical Appliance Division, Westinghouse Electric Corporation, East Springfield, Mass.

PRACTICAL SHORT CUTS AND KINKS



A TOOL APPLICABLE TO ANY CRIMPING JOB



With this ingenious device, sheet metal up to 16-gauge may be crimped either at the bench, on the job, or after installation. The tool will work equally well on straight edged metal, sheets or pieces curved to any shape, on the inside of blanked-out holes or wherever crimping on sheet metal may be required.

In its general shape, it is not unlike the familiar can opener attached to the kitchen wall or a tool used by shoemakers to crimp pieces of leather together. Two round dies, one with a projecting edge, the other rounded to fit, are held together by spring tension and an adjustable screw to fit them for various thicknesses of metal.

Turning a crank pulls the metal sheet between the dies. Held firmly against a guide, the edge of the metal is crimped to the desired shape. But little physical strength is required for the operation, certainly no more than that needed to open a can of food in the kitchen. Furthermore, the time saved is at least half that required with any other hand tool which would perform the same job.

The tool—which was perfected by Frank Lucarelli, Tool Designer of The Glenn L. Martin Company, Baltimore, Md.—may be operated by clamping it in a bench vise, probably its most widely used place. By substituting a wheel for the conventional handle (with little sacrifice in leverage) it also can be used right on the piece needing crimping after it has been installed in the airplane, or a new crimp can be put into a piece of sheet metal without having to remove it completely from the ship.

Rachet wheels may be installed in the device so that there is no slipping, because, being small and handling only the thinner sheets of metal, the gears will not unmesh sufficiently to become separated.

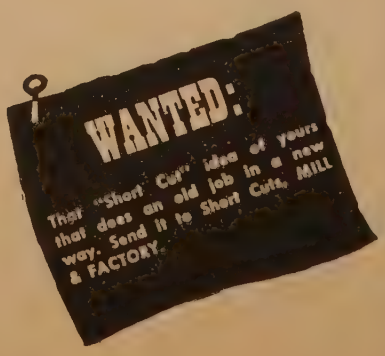
One of the most important factors is that of safety, when compared with previous methods of hand crimping. Most of these required a tool looking somewhat like an oversize pair of pliers which was literally pulled around the edge of the sheet by sheer strength. Having no stationary guide, the device did not always give a satisfactory crimp. It was dangerous also, as the tool sometimes slipped off under the pulling necessary to make it operate, and a nasty gash in the operator's arm resulted. This hazard is now entirely eliminated.

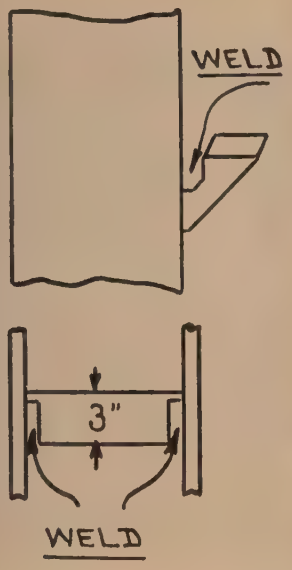
HOLDING FIXTURE IMPROVES PART AND SAVES TIME

These arm rests were formerly assembled by hand. The operator was required to smooth out the felt on the arm rest base and hold it securely, and cement it to the frame at the same time. This act required dexterity on the part of the operator, and strong fingers. As most of the operators were women who did not possess the necessary strength, the finished product was not uniform in appearance and was frequently rejected.

Ansel Eager of the Douglas Aircraft Co., Inc., Santa Monica, Calif. devised a vise fixture that is made to the contour of the arm rest. Arm rest base and covering felt are now placed in the fixture which is tightly compressed by clamps. The felt is held firmly and even while the sides are cemented.

Results: Quality work is produced with great time savings. Approximately nine hours are saved per ship.





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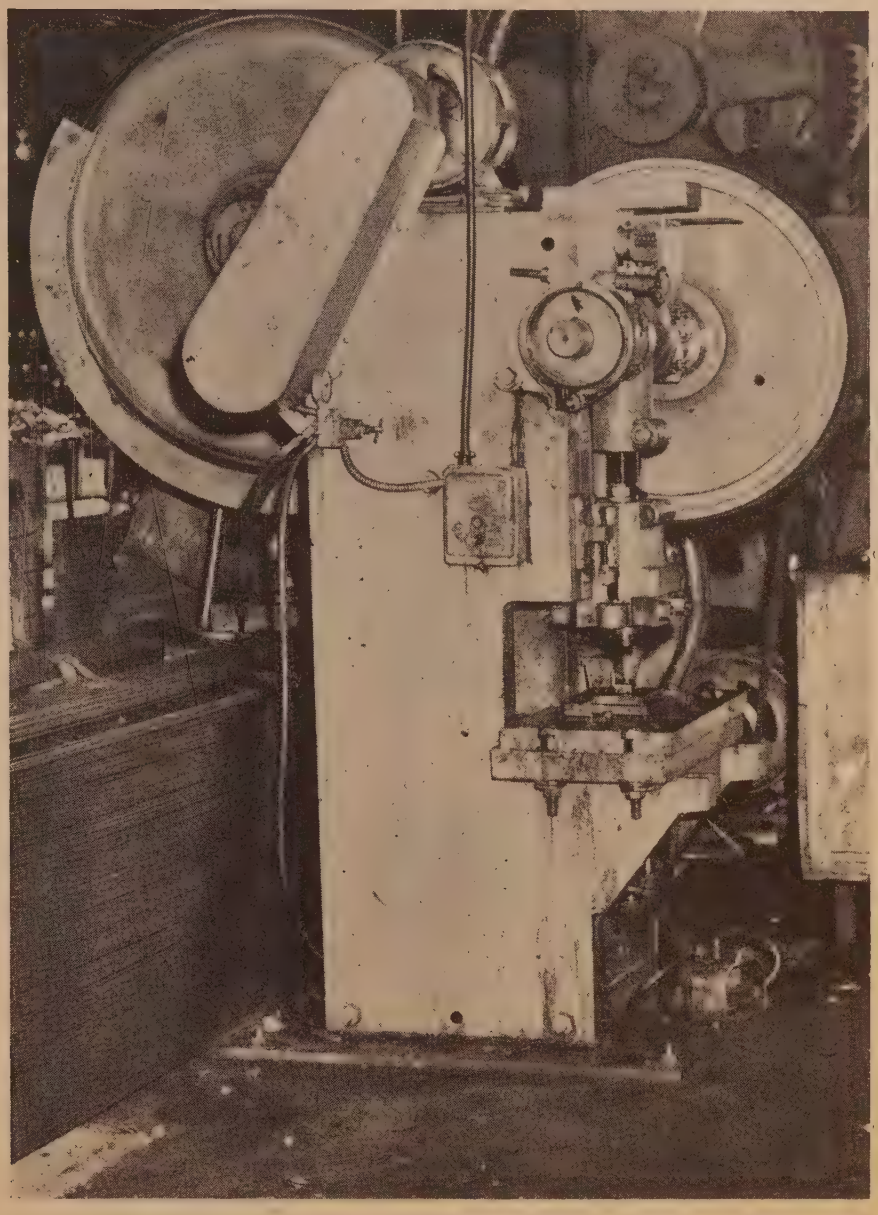
SAVING THOUSANDS OF DOLLARS IN PRODUCTION

★



What to do about broken machinery requiring months before replacement is possible, while impatient customers demand deliveries, has been answered in one way by Schroer Manufacturing & Metal Stamping Company, Kansas City, Missouri.

In the case of the metal stamping company, the cast iron frame of an open-back, non-inclinable press with 3-inch stroke broke in two. Thousands of dollars in production would be lost if the company waited the nine to twelve months it would take to get a new press, so a method of rebuilding which would assure future performance warranting the cost was studied.

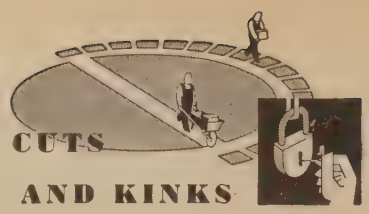
In order to obtain greater capacity and greater rigidity, the new frame for the press was fabricated in the company's own plant from steel. The gear guards also were fabricated in the shop.

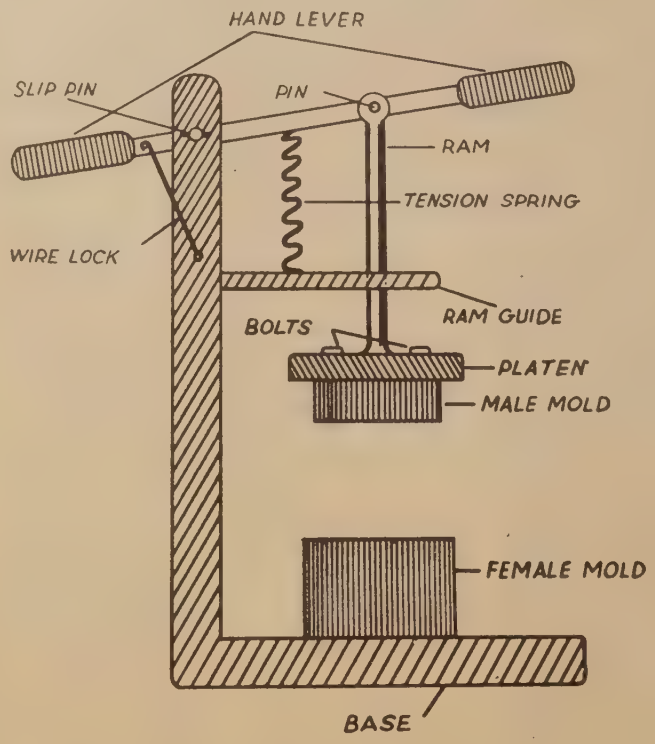
The entire frame is of all welded construction with 3-inch plate all through the frame, which is 6 feet high and 24 inches wide. On the 3-inch plate, a U-joint was considered most desirable as it required less welding. To obtain the desirable deep penetration and high physical properties, shielded arc electrodes were used. Up to 12 passes were used at some points.

The crankshaft and slides were from the old press. Other parts were fabricated at the Schroer plant. When the work was completed, the metal stamping company had a rebuilt press of 60-ton capacity, about 20 per cent greater than the former press, due to the rigidity of the steel construction.

This item comes from The Lincoln Electric Company.

PRACTICAL SHORT CUTS AND KINKS





MANUAL PLASTICS PRESS FOR PRODUCING VARIETY OF SHAPES

The accompanying illustration shows the details of an unpatented press which can be utilized manually to produce shapes heretofore unobtainable with liquid casting plastics. Its general design and construction can be varied for numerous types of work, and its simplicity is such that it could be easily constructed in many home workshops. It was originally developed for experimental work by S. M. Milanowski, a consulting engineer at Los Angeles, Calif.

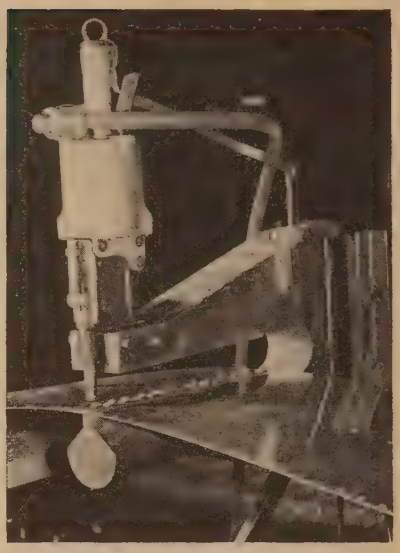
Two handles and a tension spring on the lever make it possible for two men to exert more than 50 pounds per square inch pressure with the ram, and this is sufficient to produce thin-walled articles that are both homogeneous and strong when quick-curing casting resins (such as recently-developed phenolics) are placed in the mold cavities.

Dimensions of the press depend entirely on dimensions of the molds and work to be accomplished. Largest article thus far produced with a manual press of this type is a 15″ x 12″ x 8″ photographic developing tank.

Low-cost molds for the press can be made by casting thermosetting plastics over plaster models or by casting various alloys in sand molds. Adequate curing heat can be provided by positioning infra-red bulbs around the molds after they are set up in the press.

Thomas A. Dickinson, Los Angeles, Calif., sent in this idea.

RIVETING SET-UP SIMPLIFIES JOB

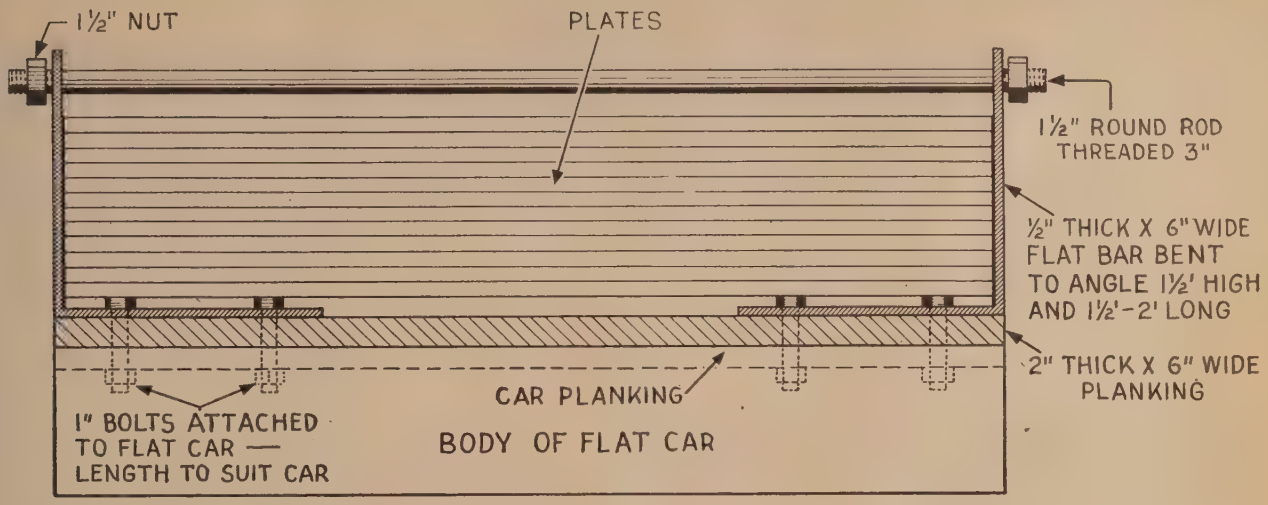


High-speed airplanes require riveting that is flush with the surface because of the advantages gained from the lowering of air resistance and weight considerations. With the present trend toward ever-increasing speeds, the tendency is to flush-rivet all exterior surfaces. In the cases where flush rivets are not used, brazier head rivets are usually installed because they present less protruding area than round or flat head types.

A simple machine, designed and built by the Ryan Aeronautical Company, speeds the riveting of aircraft wing panel splices and permits one riveter to do the work of two.

This machine utilizes a pneumatic squeezer which is mounted in a special holder to install brazier head rivets. An attachment with brazier head sets is used and the riveter is operated by a foot control.

Designed to rivet ribs to the skins of leading edges and splices on panel skins, the machine will accommodate either right or left hand sections. It eliminates the need for a second person, or rivet bucker, and saves considerable time and money because of the reduction of rejections it effects. Very little skill is necessary for its operation because of the fact that the rivet sets and anvil are adjusted for the correct rivet height and pressure.

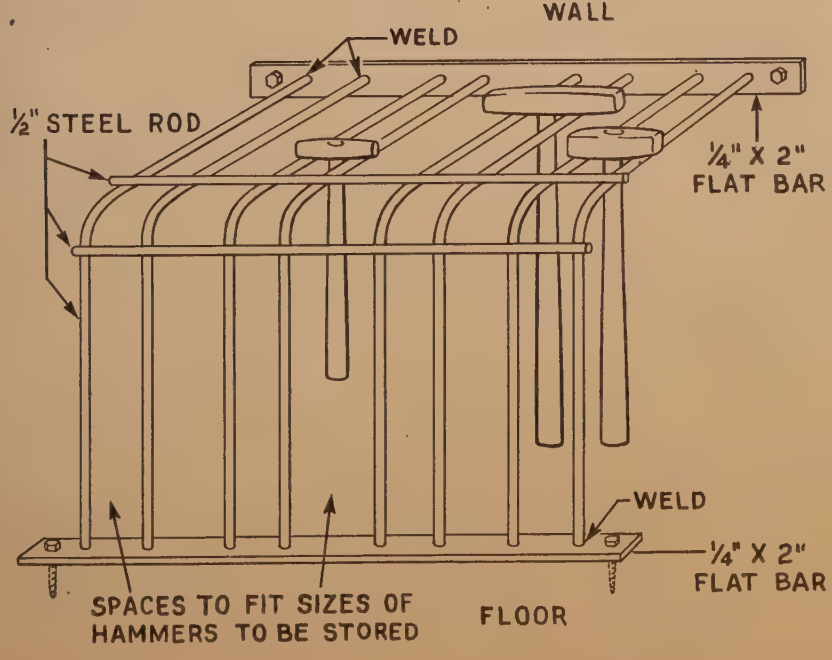

1½" NUT
PLATES
1½" ROUND ROD THREADED 3"
½" THICK X 6" WIDE FLAT BAR BENT TO ANGLE 1½' HIGH AND 1½'-2' LONG
2" THICK X 6" WIDE PLANKING
CAR PLANKING
1" BOLTS ATTACHED TO FLAT CAR — LENGTH TO SUIT CAR
BODY OF FLAT CAR

HANDY BRACKETS FOR SHIPPING HEAVY PLATES

When loading flat railroad cars with heavy plates or sheet steel or any other similar type materials, ½" x 6" flat bar made up in the form of a bracket will come in mighty handy.

The bracket should be approximately 1½ ft. long, with the height depending upon the amount of material to be loaded. A 2" x 6" plank should go the width of the car to allow materials to be slung without a lot of manual work. The bracket should be drilled for 1" bolts which should go through both the extra planking and the planking of the car to give it sturdiness. A 1½" rod threaded on both ends should extend the width of the car, plus a few inches on either side for the nuts to bind the load so that it cannot shift.

The number of brackets would depend upon the lengths of the plates you are shipping, says William H. Mullen of Quincy, Mass.

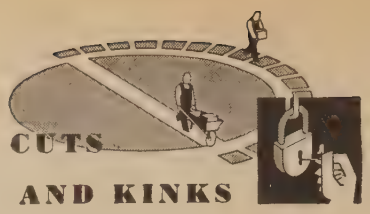


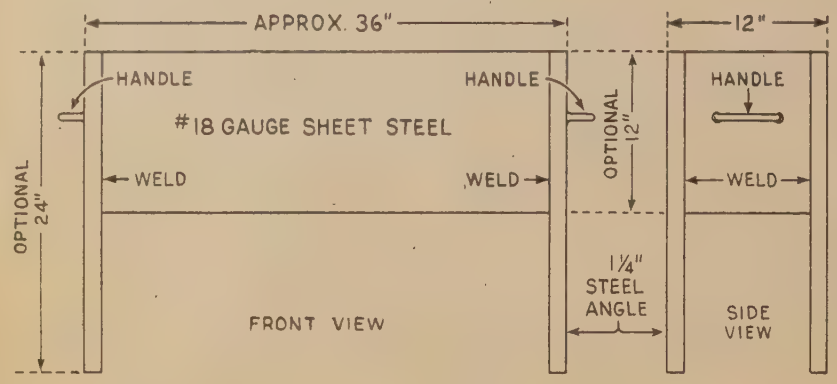
CONVENIENT RACK FOR STORING HAMMERS

Claw hammers, hand hammers and sledge hammers are hard to store; but this difficulty can be successfully overcome by building a rack made up of ½" steel rods and a couple of pieces of flat bar. The space between the hammers is determined by the hammers you intend to store in this rack.

It can be attached to the wall or it can be made up to stand in the middle of the floor by duplicating the front of the rack and adding a couple of pieces of flat bar for stiffeners at the bottom.

PRACTICAL SHORT CUTS AND KINKS





MATERIALS BOXES ELIMINATE STOOPING

A handy materials box can be made up of sheet steel and a few angle bars. If a box 1′ high is desired, bend a sheet of No. 18 gage sheet steel 36″ x 36″ in a U shape—that is 12″ x 12″ x 12″ and 2 pieces 12″ x 12″ for the sides can be welded on either side completing the box. Then legs made up of 1½″ angle, 2′ long, should be welded on the outside giving the box additional strength.

This box, suggested by William H. Mullen, Quincy, Mass., will eliminate much stooping. Furthermore, it can either be carried by workmen or picked up by a jack truck for transport to its destination.

The boxes can, of course, be made to any sizes desired.

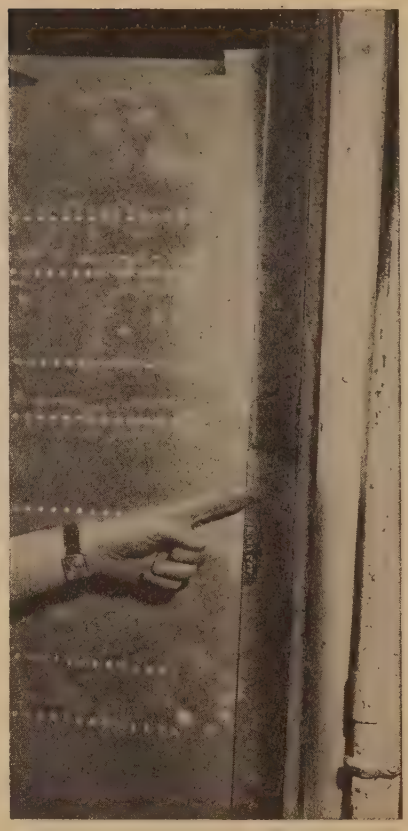
REDUCING ACCIDENTS FROM SLIPPING

Are you having trouble from numerous injuries because employes slip on smooth, wet steel floor-plates that you may be using for manhole covers, or platforms? Or do your workers slip on the capped steps in those cement stairs, either indoors or out of doors?

The following helpful suggestion is offered:

Have your welder use up a little of the old welding wire that may be lying around your plant by letting him cut a few capers with a welding bead. The design can be artistic, or it can contain mighty words of safety. It can be of straight or crooked lines. But whatever it is, it will solve those slippery problems, either indoors or out. It will increase your employe's safety as he works around oils and steels, in wet locations, in loose dirt, or even in the winter's snows. This beading will take the slipperiness from the steel plates without any use of compounds or emery stair treads being applied.

DRILL JIG SPEEDS INSTALLATION AND RIVETING



This tooling is used for speeding up the installing and riveting of the section assemblies on the center wing at the Douglas Aircraft Company, Inc., Santa Monica, Calif.

Two people were required on each left and right side of the wing for installing this rib. After drilling out top and bottom skins, the ribs had to be removed from the jig in order to countersink angles, then replaced.

The new method, suggested by Arthur Hightower, is to use the drill bar for drilling the rivet pattern. This rib is installed, the jig is attached, and all holes are drilled.

The jig is then removed to permit countersinking of rib and installation of the skin panel. The jig is attached again and all holes are drilled through the skin, after which the jig is removed and the skin is riveted to the rib by drawing the rivets and skin into the countersunk rib angles.

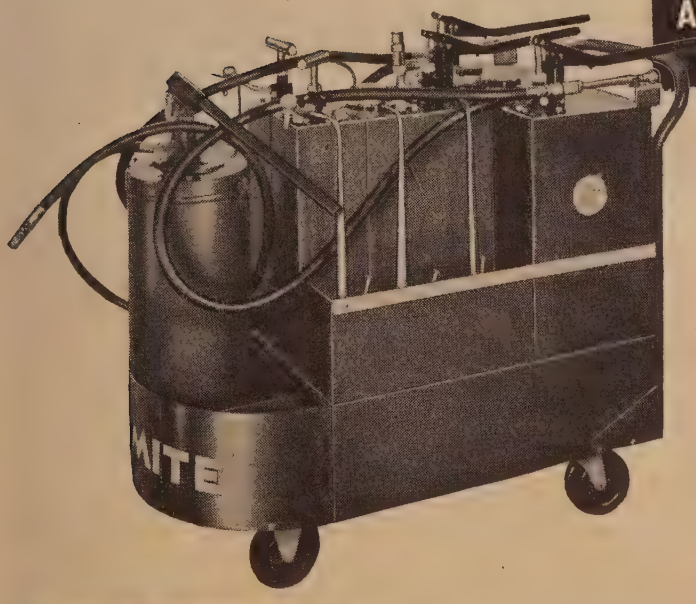
Results: Eliminates second handling of the rib and saves time in dimpling the skin. Rear section assembly time has been reduced by approximately four hours per ship.

YOUR CHOICE for Immediate Delivery!

COMPLETE LUBRICATION DEPARTMENTS ON WHEELS

Alemite LubriKarts Make the Transferring, Handling and Application of Lubricants a Quick, Clean, Easy Job

Alemite Hand-Operated LUBRIKART



QUICK FACTS

★ Equipped for handling 6 types of greases and oils.

★ Storage capacity for as many as 6 lever-type or push type guns, adapters, tools, waste, etc.

★ Carries 30-lb. capacity high pressure portable grease pump with 5½ ft. hose and hydraulic coupler.

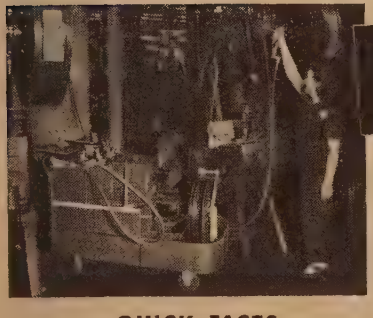
★ Equipped with six 1-quart hand oil cans.

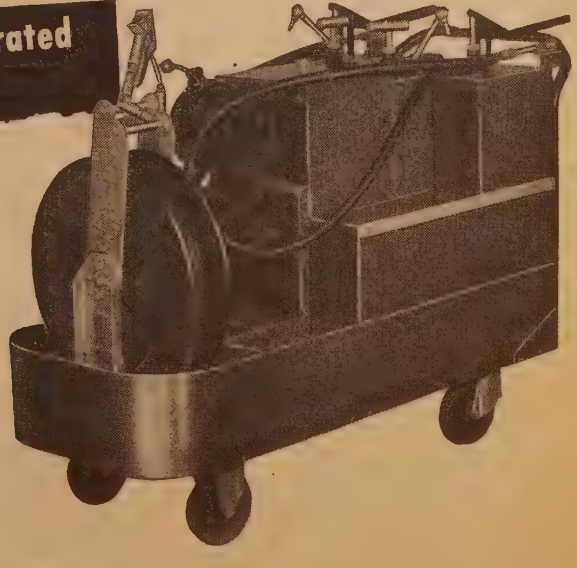
★ Five individually operated grease and oil pumps.

★ Three 7 gallon tanks—two 1¾ gallon tanks.

★ Complete unit, 44″ long x 21″ wide x 37½″ high, wine colored, baked enamel finish.

Alemite Electric-Operated LUBRIKART





QUICK FACTS

★ Equipped for handling 5 types of greases and oils.

★ Added advantage of a built-in, high pressure, electric power gun.

★ 20 ft. high pressure lubricant hose mounted on spring return reel.

★ Comes equipped with six 1-qt. hand oil cans.

★ Four hand operated grease and oil pumps.

★ Two 1¾ gal. and two 7 gal. tanks.

★ Storage capacity for as many as six lever-type or push-type hand guns, adapters, tools, waste or wiping cloths, etc.

★ Complete unit 55¼″ long x 21″ wide x 39″ high, finished in wine baked enamel.

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Ideas FROM INDUSTRY

New and Improved Methods Being Used By Industry

PHILADELPHIA L-M ASSEMBLY PLAN

The Philadelphia Labor-Management Assembly, which was set up by Peter J. Manno, director of the Philadelphia branch of the Conciliation Service, has already proved itself of effective value in settling labor disputes. Although only going into service around the first of the year, in the single month of January the Assembly was instrumental in settling 11 major labor disputes.

In 9 of these cases strikes were actually prevented; while in 2 cases strikes which had gone into effect were stopped.

The Philadelphia Labor-Management Assembly is composed of 24 members—12 prominent industrialists and 12 prominent labor leaders—with Mr. Manno of the Department of Labor's Conciliation Service acting as chairman. The territory covered by this group includes eastern Pennsylvania, southern New Jersey, Delaware, Maryland, the District of Columbia and the northern part of Virginia.

Members of the Assembly representing management are Don Marquis, labor relations council in Philadelphia; John Hoerle, vice-president of Campbell Soup Co.; Arnold K. Weber, personnel manager, RCA Manufacturing Co.; Rudolf F. Vogeler, Philadelphia Board of Trade and Chamber of Commerce; Harry Langdon, personnel director, SKF Industries, Inc.; Carter Shaub, general manager of eastern division for Sears & Roebuck; Dwight R. Collin, personnel director, Mack Manufacturing Corp.; James G. Flanigan, labor relations advisor, Philadelphia; Edward Kessler, chief labor director, Armstrong Cork Co.; Chester F. Hockley, president, Davidson Chemical Corp.; F. Morse Archer, Jr., attorney; and Charles A. Wolf, attorney.

For labor there are James McDevitt, president, Pennsylvania State Federation of Labor; John O'Neal, president, Teamsters Joint Council No. 53; Lee W. Minton, international president, Glass Bottle Blowers Association; Anthony Matz, international vice-president, Brotherhood of Firemen and Oilers; Angelo Cefalo, regional director, United Mine Workers, District 50; Michael S. Harris, president, Philadelphia Industrial Union Council; John Green, international president, Industrial Union of Marine and Shipbuilding Workers; Harry Boyer, president, Pennsylvania Industrial Union Council; Charles Weinstein, manager, Philadelphia Joint Board of Amalgamated Clothing Workers; James Price, president, District Council 1, United Electrical Workers; A. K. Plane, AFL attorney; and M. H. Goldstein, CIO attorney.

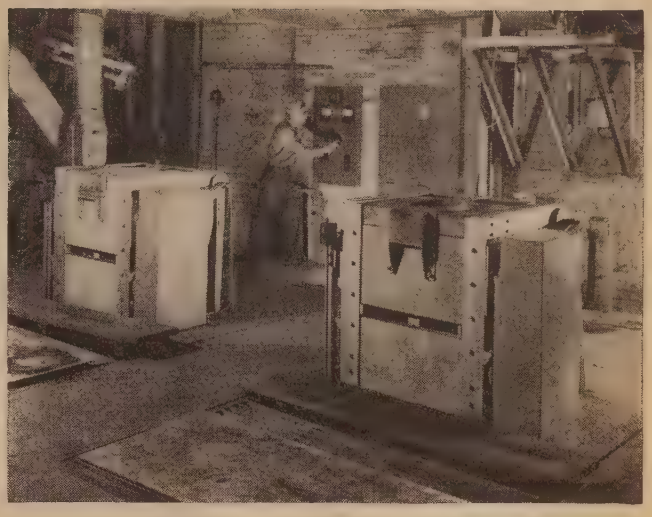
The entire assembly meets regularly 12 times a year, but may be called into session anytime that an extraordinary labor dispute arises, such as one that would tie up the utility of transportation facilities of a large community. In most cases the Assembly works quietly behind the scenes to bring about an agreement.

Whenever the Philadelphia Branch of the Conciliation Service runs into a snag in settling a labor dispute, Mr. Manno calls in one or more of the Assembly who might be acquainted with the disputants or their particular problem. In this way various members of the Assembly settled 11 labor disputes during their first month of operation. Seven of these disputes were settled by management members of the Assembly; four by labor members.

The success of the Philadelphia Assembly plan has caused other communities in all parts of the country to consider setting up similar plans in their own districts. Industries in Buffalo, New York, are already taking active steps to form a L-M Assembly for their district.

ELECTRONIC FREQUENCY CONVERTING FOR INDUCTION FURNACES

Many companies use mercury arc power rectifiers for converting large amounts of alternating current into direct current. The Michiana Products Company, however, are using Allis-Chalmers power rectifiers as frequency chargers. The installation includes a 300-kw steel tank mercury arc rectifier which converts 3-phase 60-cycle power into 1000-cycle power for use in induction furnaces for melting alloy steels. The high frequency power is supplied at 880 volts and melting time is about 45-minutes. The furnaces, shown in the illustration, are equipped with complete tilting control mechanism with electrically operated motors located under the floor plates.



COMPANY EMPLOYES PRESENT OPEN HOUSE

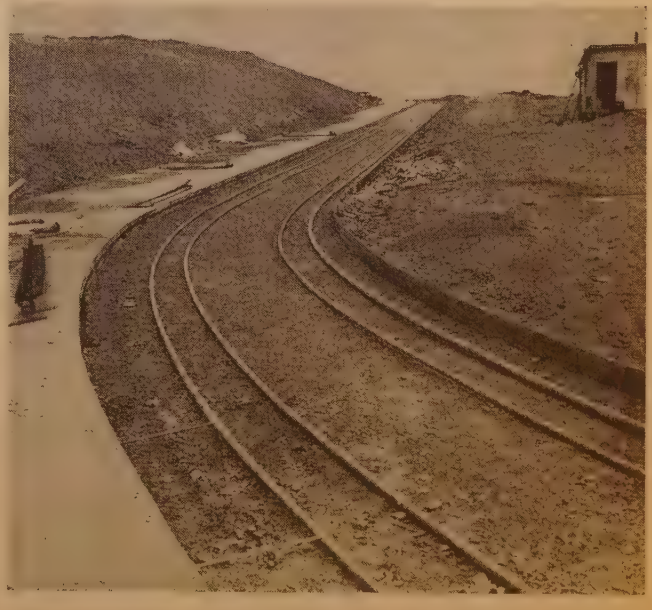
When The Stanley Works in New Britain, Conn. announced the near completion of their Building No. 150, it marked the culmination of a construction program begun two years ago. The employes of the company reversed the usual procedure and, with the approval of the management, staged an observance of the occasion by taking over a floor of the new seven-story building and presenting a first-class open house. Employes, their families and other citizens of New Britain were given the opportunity of not only inspecting the new building, but of seeing the products of all divisions of the company.

Approximately 20,000 people attended the open house and looked at the elaborate exhibits and over 500 sq ft of photographic murals showing the twenty plants of The Stanley Works. Food and entertainment were also included.

SNOW REMOVAL

To eliminate the hazard and delay that could be caused by winter's snow and ice on a 600-ft. long, two-lane roadway leading into the Bridgeville, Pa., plant of American Cyanamid Company, engineers of that firm have designed a unique snow-removal system consisting of hot water pipes embedded in the concrete pavement. The road, 24-ft. wide, is on a constant up-grade from the plant to a main thoroughfare. Snow and ice would make it virtually impassable, creating a severe traffic problem during shift changes.

Eight lines of black wrought iron pipe run the entire 600 feet of roadway and carry hot water at an average temperature of 165 degrees F., at the rate of 50 gallons per minute. Sufficient anti-freeze solution is added to the water to prevent the system from freezing during periods of non-operation.



• INDUSTRIAL MUSCLES ON DISPLAY

Left: One of the materials handling demonstrations at the show.

•

Below: The main floor of the Cleveland Public Hall showing exhibitions of materials handling equipment. A similar floor below this one was also filled.

The first national show devoted exclusively to materials handling equipment was held at the Public Auditorium in Cleveland, Ohio, January 14 to 17 with over 12,000 people in attendance. Over 100 exhibitors displayed everything from movable floor cranes to shock absorbing casters. With the American Warehousemen's Association also holding their annual meeting at the same time, the National Materials Handling Exposition was attended by thousands of keenly interested visitors.

The exposition was dominated by industrial shop trucks, but gravity conveyors, hoists, portable belt conveyors, steel strapping equipment and supplementary materials handling devices played a big part. Pallets of all kinds were on display and examined with interest. A great many of the displays were in actual operation so that the visitors could see just how the equipment performed.

One highlight of the warehousemen's convention was a demonstration on the stage of the Public Auditorium, titled, "Machines at Work." The stage was laid out to resemble an actual warehouse operation, with what was intended to resemble a freight car. By an actual demonstration on the stage it was shown how modern types of materials handling equipment can speed up and reduce the cost of handling operations. Among the equipment actually demonstrated were 2 and 4-wheel hand trucks, barrel type hand truck, non-motorized lift truck, conveyor, portable elevators, inclined stackers, motorized hand trucks, power fork truck, and pallets. This demonstration was witnessed by a capacity crowd of nearly 4000 persons, and showed definitely how modern planning and modern machines can speed up materials handling

• Continued on page 244

Pneumatic SkilDrills... made in 7 speeds... capacity 3/16" - 1/4" - 5/16"

Pneumatic SkilRunners... 3 models for running nuts for 1/4" or 3/16" machine screws

Pneumatic SkilDrivers... 3 models for driving 1/4", No. 12 or No. 10 wood or machine screws

Pneumatic SkilHammers... 3 sizes, 4 models in each... capacity 1/8" to 1/4" rivets

Pneumatic SkilGrinders ...3 models... also used as rotary files

You Can Get These Advanced Type

PNEUMATIC SkilTools

from

Your Regular SkilTool Distributor

Pneumatic SkilTools are engineered and built to the same high standards that have won respect for Electric SkilTools in every industry. All of these new SkilTools are extremely compact...light in weight (the grinder weighs only 1 pound)...easy to handle under constant operation. See your SkilTool Distributor today about a demonstration.

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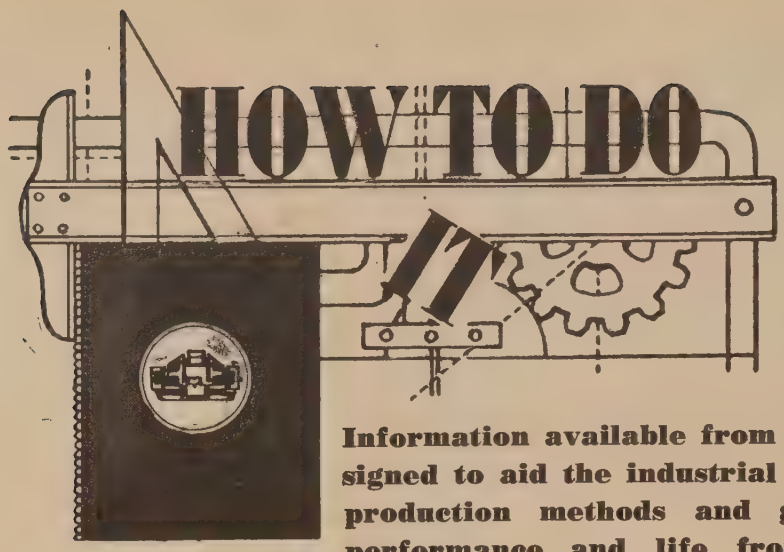
5033 Elston Ave., Chicago 30, Ill.
Factory Branches in Principal Cities

ELECTRIC PNEUMATIC
SkilTools

SkilSaws SkilSanders SkilNibbler SkilShear SkilGrinders SkilDrills

MADE BY SKILSAW, INC.



Information available from manufacturers designed to aid the industrial executive improve production methods and get the maximum performance and life from his equipment.

1. VACATIONS— Results of study and analysis of vacation plans of 224 leading firms are published in report, "Vacations for Industrial Workers". Reports cover company policies, types of plans, provisions of plans, service requirements, methods of calculating vacation pay, assignment of vacations to individuals, etc. Metropolitan Life Insurance Co.

2. POWER PLANT GUIDE— 12-page instruction booklet #28X6385 and entitled "Water Conditioning Chemicals and Equipment" is written for guidance of power plant operators. Touches on importance of feedwater control, care of testing equipment, obtaining samples, test procedures, and carries handy reference tables for reporting results. Allis Chalmers Mfg. Co.

3. PROTECTIVE CLOTHING—Catalog section #12000 presents line of industrial protective clothing including many new products introduced in recent months. Each garment is pictured with description of its functions in industry. B. F. Goodrich Co.

4. INSECT KILLER—Folder on a 25% DDT concentrate describes industrial uses for insecticide said to be highly effective and economical and to require only few applications a year. Information covers how and where to apply the product in industrial plants to control roaches, flies, silverfish and other common pests in cafeterias, washrooms, locker rooms, etc. The Sherwin-Williams Co.

5. METAL MARKING EQUIPMENT — Catalog entitled "Metal Marking Equipment for Industry" has 16 pages devoted to bench marking machines, stamping dies, numbering heads, embossing numbering heads, engraving, knurling machines and pliers, roll cradles, roll marking machines, and other equipment. Wm. A. Force & Co.

6. THERMAL PROPERTIES— Technical bulletin, "Thermal Properties of Plexiglas", offers the engineer and designer a quick and accurate method of determining the heat losses through Plexiglas, the thickness of Plexiglas necessary to effect a desired insulation, and gives other vital technical information necessary for intelligent design of Plexiglas objects. Information was compiled under scientific laboratory conditions to secure accurate facts to be of commercial value to technicians. Rohm & Haas Co.

7. HYDRAULIC EQUIPMENT — The preliminary postwar catalog #P-46 gives the complete line, including new and reinstated items, of hydraulic units and attachments. Its universal shop tool is hydraulic jack with

specialized attachments to do pushing, pulling, pressing, bending, spreading and clamping jobs. Jack's basic elements include hand operated hydraulic pump, high-pressure hose which transmits oil under high pressure from pump to ram; a ram plunger which works in all directions, and special attachments with threads for quick couplings into combinations with ram. Blackhawk Mfg.

8. TACHOMETERS—Advantages of these hand tachometers are pointed out in folder, "Improved Tachometers". Are said to be accurate within ½ of 1%; to withstand hard usage for lifetime; have readings always accurate; be unaffected by outside influences; have no shifting troubles due to rotating gear shift. O. Zernickow Co.

9. TRACING MATERIAL—A translucent tracing material providing clean, easy-to-read engineering prints is described in 4-page pamphlet entitled "Kodatrace". Is made of safety-base film tinted blue and has fine-grained matte surface for use with pencil or ink. Eastman Kodak Co.

10. TEMPERING—Tempering in standard rated furnaces is described in 4-page bulletin #SC-133, profusely illustrated. Describes different types of furnaces recommended for tempering various kinds and shapes of ferrous objects. Furnaces shown include forced convection, oven and pot types. Surface Combustion Corp.

11. CONCILIATION SERVICE — Pamphlet GPO 0-726056, entitled "Settled Peacefully, 13000 Industrial Disputes in 1946", is designed to introduce the reader to the U. S. Conciliation Service and to acquaint him with its activities. Service is equipped to aid unions and employers at the bargaining table. U. S. Conciliation Service.

12. STEAM MAINTENANCE HINTS— "Maintenance Hints for General Purpose Turbines" is 95-page vest pocket booklet packed with valuable information. Is designed to stress importance of preventive maintenance. Considers installation, piping, sealing compound lubricating oil, operation, capacity, inspection, and many other phases. Westinghouse Electric Corp.

13. ALUMINUM— To meet demand for more technical information on fabricating and processing aluminum in all its forms, a monthly technical paper entitled, "Technical Advisor" has been published. Bulletin publicizes latest recommendations on how to use aluminum mill products most effectively. Has question and answer section and serial technical process studies. Periodical is free — check this item. Reynolds Metals Co.

14. PALLETS ETC.— Attractive brochure entitled, "By These Good Names You Shall Know Us", describes and gives application pictures of pallets; pallet boxes for use with any fork-lift truck that moves bulk or carton-packed products weighing up to 4000 lbs; wirebound crates; general boxes; stitched panel crates; corrugated containers, etc. General Box Co.

15. GLOW LAMPS— A discussion in question and answer form on neon glow lamps is given in Nela Specialty bulletin #310-131. "What are neon glow lamps? Why are they called 'cathode glow' or

• Continued on page 164

Important Message to Wire Rope Buyers

FOR THE FIRST TIME IN FOUR YEARS WE CAN GIVE IMMEDIATE DELIVERY IN UNLIMITED QUANTITY ON FAMOUS TIGER BRAND WIRE ROPE. GUARANTEED EXCELLENCE ON ALL COUNTS. ADVISE PLACING YOUR ORDER PROMPTLY TO BE PREPARED FOR BUSY YEAR. DON'T GET CAUGHT WITH YOUR LINES DOWN! REMEMBER THE BIG DEMAND IS FOR TIGER BRAND. WAREHOUSE STOCKS ARE COMPLETE. WRITE WIRE OR CALL THE OFFICE NEAREST YOU.

AMERICAN STEEL & WIRE COMPANY
Cleveland, Chicago and New York
COLUMBIA STEEL COMPANY
San Francisco
Tennessee Coal, Iron & Railroad Company, Birmingham,
Southern Distributors
United States Steel Export Company, New York

UNITED STATES STEEL

Excellay Preformed

The BIG Demand is for Tiger Brand

• Continued from page 162

'negative glow' lamps?"—such questions taken up. General Electric Co.

16. POURING BEARINGS—"How to Pour Bearings" is title of 2-color wall card showing by means of series of 6 cartoon type pictures, the steps necessary to secure good, tightly lined bearings. Joseph T. Ryerson & Son.

17. RADIAL SAWS— Any woodworking plant having a production line job should be interested in bulletin on radial saws claimed to reduce cutting costs. Saw is used whenever ripping, mitering, shaping, tenoning, dadoing, routing, or variety of jobs are performed. Gear motor allows smaller blades and greater sawing capacity with less power per cut. Walker-Turner Co.

18. SALVAGING TOOLS— 20-page catalog covers carbide and high speed tool salvaging. Listed are operations performed to salvage tools for half the cost of new tools. Shows possibilities of carbide resalvaging of milling cutters, drills, reamers, counterbore, spotfacers, centers and special cutters of all types in the side and end cutting categories, as well as centerless grinder rest blades. National Tool Salvage Co.

19. POWER—"More Power to U.S.A." is title of handsome 32-page brochure #25B6150 which describes and portrays company's products used on generating, substation, transmission and distribution systems. Shows equipment available for power generation and distribution, ranging from steam and hydraulic turbines, turbo generators, engine type generators and condensers and auxiliaries to pumps, water conditioning, motors, motor control, switchgear, etc. Allis-Chalmers Mfg. Co.

20. CRUSHERS—Bulletin #794 concerns double roll crushers particularly suited to breaking down various friable materials of medium hardness such as coal, coke, burned lime, chemicals, cinders, dry clay and medium hard shales. Crushers have stiff and rigid unbreakable welded steel frames; are fitted with removable bronze bushings. Jeffrey Manufacturing Co.

21. JACKS— Catalog #203 gives full details on types, sizes and uses of company's line of jacks including automatic lowering jacks for general lifting and lowering. Duff-Norton Mfg. Co.

22. WORK MEASUREMENT—Industrial engineering bulletin #200 describes the work measurement project being conducted by the University of Iowa. The project is designed to aid industrial engineers in improving accuracy and consistency of time standards set by stop-watch time study and to develop a national and international "standard day's work". University of Iowa.

23. STANDARDS AVAILABLE — A list of 864 standards approved for national use of industry by the American Standards Association is published in printed booklet #4701, January 1947. Includes many standards developed under war procedure and now approved for peacetime use. Includes definitions of technical terms, specifications for metals and other materials, methods of work and methods of test for finished products. American Standards Assn.

24. HYDRAULIC OVERLOAD— Bulletin #F85—2M gives information on the hydraulic overload pitman for punch press. Is said to eliminate bent or broken crankshaft, broken press frame, and broken tools and dies. Said to be easily installed and require no maintenance. Its operation is described. Dayton Rogers Mfg. Co.

HOW TO DO IT

25. AUTOMATIC CLAMPING — Bulletin #1046 concerns automatic power clamping for fixtures in connection with

automatic processing machines for drilling and tapping. Is arranged for either hydraulic or electric operation and completely eliminates wrenches. National Automatic Tool Co.

26. RUTS & HOLES—"Over Ruts and Holes" is title of folder outlining overlaying or patching of worn concrete, wood, brick or composition floors with a resurfacer. Stonhard Co.

27. COUNSELING AIDS—"Aids in Counseling" is pamphlet which lists publications of Department of Labor bureaus referring to employment and organization. Arrangement is under five groupings: ready reference; background information; counseling techniques, services, and training; periodicals, and miscellaneous. U.S. Department of Labor.

28. STUD WELDING—36-page 1947 data book provides factual information on use of automatic stud welding. Complete information on designing for stud welding is given. Final section describes typical applications in automotive, contracting and construction, boiler and tank, railroad, electrical equipment manufacturing and general metal-working fields. Nelson Sales Corp.

29. INFRARED LAMPS— Illustrated folder #Y-689 has 6 pages of descriptions, photographs and technical data on all industrial heat lamps made by company. Points out uses to which lamps are put; enumerates advantages of using infrared lamps for industrial heating, drying and baking. Describes 4 main types of ovens used in employing infrared lamps industrially with diagrams and pictures of each. The General Electric Co.

30. BOILER CLEANER— Folder "KEK" describes boiler cleaner and steam conditioner said to clean scale, rust, oils and organic matter from heating surfaces of boilers, from steam distribution lines, radiators and air vents, also to remove minerals, gases and emulsions from boiler water. Kenite Laboratory, Inc.

31. SPLIT PILLOW BLOCKS—Bulletin entitled "Split Pillow Blocks" describes 9 new performance features of these blocks which have self-aligning roller bearings. Are claimed to provide easier assembly, better lubrication, better bearing and machine performance, and require less maintenance. Shafer Bearing Corp.

32. CARBON MONOXIDE ALARM — Bulletin #DR-3 describes a carbon monoxide alarm, industrial type, for use where CO concentrations may become dangerous. Alarm provides protection for operation around blast furnaces, in steel mills, chemical plants, etc. Mine Safety Appliances Co.

33. RELAYS—20-page catalog #6 describes and illustrates small power relays and medium power relays. Gives pertinent information on method of selecting relays, operating characteristics, contact circuit arrangements, contact ratings, etc. Signal Engineering & Manufacturing Co.

34. BALL BEARINGS—Bulletin #47 concerns radial and pivot ball bearings said to offer high performance at moderate cost in compact mechanisms or instruments where accuracy, low friction, high capacity and long life are important. Specifications and tolerance tables included. New Hampshire Ball Bearings, Inc.

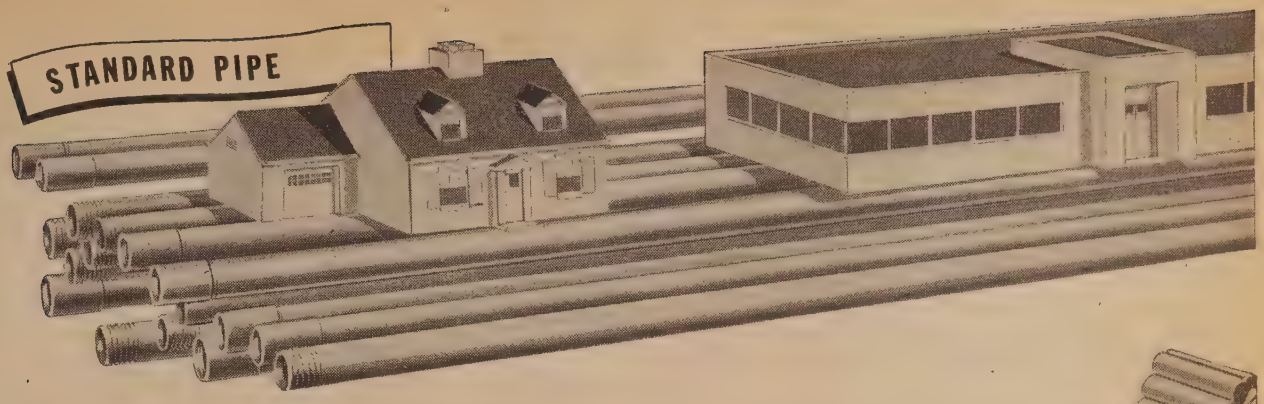
35. FRACTIONATOR—Bulletin #205 introduces adsorption fractionator specifically designed for light hydrocarbon analysis. This instrument is said to separate, identify, measure, and collect the components of light hydrocarbon gas mixture and record the analytical data. A discussion of adsorption fractionation, a description of the apparatus, its utilization and operation are included. Burrell Technical Supply Co.

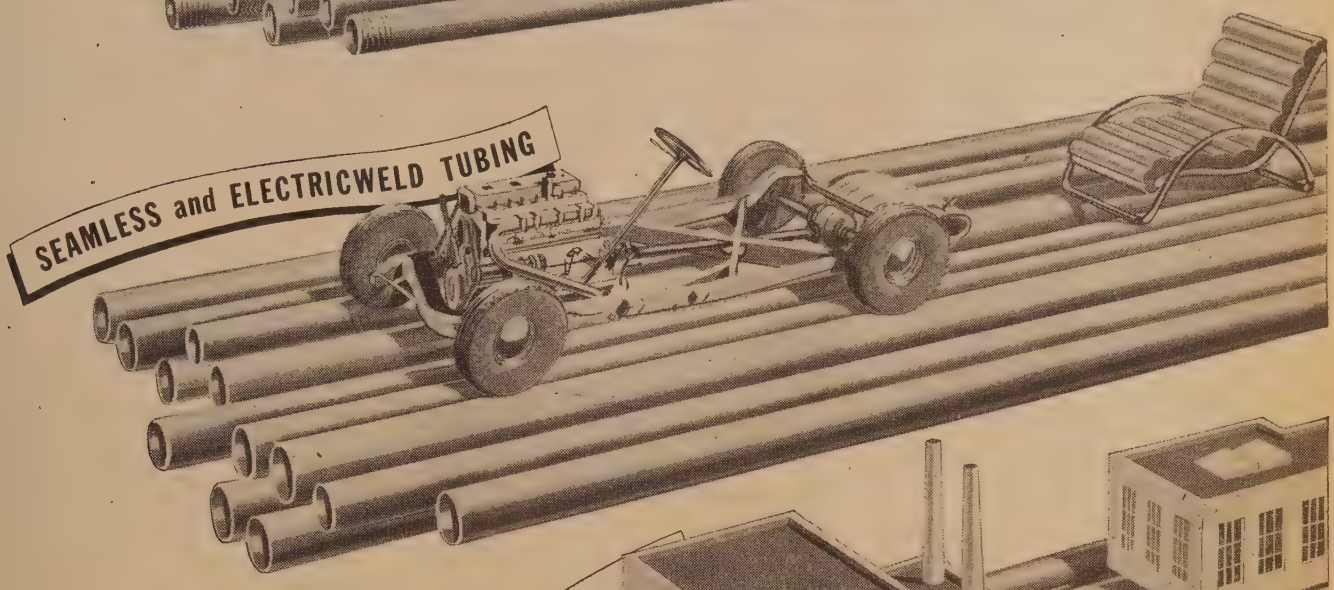
36. SPRAY BOOTHS—Bulletin #201 concerns wet type spray booths developed on hydro-whirl principle which recirculates exhausted air back into the area, thus saving tremendous heat loss. Batch type, downdraft and conveyorized spray booths are shown and described. Booth has minimum of parts and no packing glands. Peters Dalton, Inc.

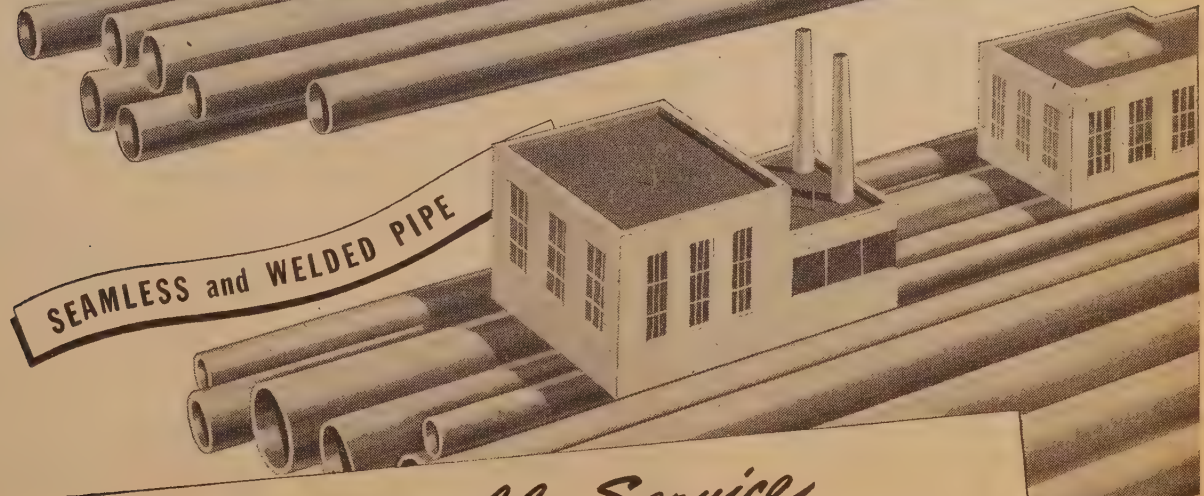
37. FLOOR MAINTENANCE — Bulletin #603, "Cut Floor Maintenance", gives test data on installations of flooring material, which is mixed simply with cement and water, to reveal its capability for heavy-duty service; prevention of accidents and damage to goods in transit; to improve trucking facilities; to resist acids, organic wastes, heat, etc. Walter Maguire Co., Inc.

38. DRILL CHUCK SELECTOR — This slide-rule type of selector makes easy the selection of the right drill chuck for any straight shank drill. With one simple setting it is possible to determine instantly the catalog number of the chuck in this company's line to be ordered. Shows recom-

• Continued on page 166







For Dependable Service

USE J&L STEEL PIPE and TUBING

The consistent high quality of J&L seamless and welded steel pipe affords you dependable service for any application. It is clean and straight, has uniform wall thickness—will bend and weld readily for installation in homes, factories, and buildings.

J&L seamless and "Electricweld" tubing is made especially for manufacturing and assembly operations. It can be readily fabricated into strong, durable machine parts, supporting members and formed sections, often with a reduction in weight and cost of the finished product.

Specify J&L steel pipe and tubing for all your installations and operations.

J&L STEEL

JONES & LAUGHLIN STEEL CORPORATION
PITTSBURGH 30, PA.

• Continued from page 164

mended speeds and feeds for drilling various types of materials. Scully-Jones and Co.

39. SOLDERING—Catalog #L201, "Pin Point Precision," describes means of faster, safer soldering with controlled heat from power units offered in 4 different models to cover range from 1050 to 2500 watts. Among advantages featured are pin point precision, no pre-heating, heat and current localized at contact point, low current consumption, more than one operator per unit, savings in cost and time, no burned insulation, no stray currents, etc. Luma Electric Equipment Co.

40. FUSES— 24-page booklet #206-A, profusely illustrated with drawings and charts, shows in detail the "powder-packed" principle in renewable fuse design. Gives helpful information for increasing production by eliminating unnecessary shutdowns; by insuring greater safety against fire and accident. Trico Fuse Mfg. Co.

41. STAINLESS STEELS— Available is latest edition of folder, "Characteristics of Rezistal Stainless Steels". Crucible Steel Company of America.

42. TEST INSTRUMENTS— Comprehensive line of test instruments is featured in catalog #129. Along with latest models, it carries complete listing of line of precision equipment. Radio City Products Co.

43. INDUSTRIAL FANS— Bulletin #F-946 concerns industrial fans for wide and diversified applications. Can be either belt or motor driven. Used "wherever loose materials can be made to flow with a current of air, regardless of whether it is in the conveying of waste material such as shavings, chips, lint, etc., or of a valuable product from one manufacturing step to another." Sprout, Waldron & Co.

44. VALVES— Seven types of valves are shown in 4-page bulletin. Include water pressure reducing valves, single acting standard altitude valves, integral pilot type cold water float valves, railroad track pan float valves, water strainers, standpipe water columns, and counter-balanced railroad standpipe valves. Golden-Anderson Valve Specialty Co.

45. POLISHING MACHINERY — 20-page catalog #55 has one section on polishing and buffing machines; another on abrasive belt grinding and finishing; another on rotary automatic polishing, buffing, brushing and deburring machines and a cylindrical finishing machine for grinding, polishing and buffing tubes, rods and round bars. Hammond Machinery Builders.

46. PUMP GOVERNORS— 16-page illustrated bulletin #463 gives engineering, operating and maintenance data on pump governors for control of reciprocating, turbine and motor driven pumps. Included are capacity tables to aid in selection of proper pump governor for specific applications. Leslie Co.

47. WELDING INFORMATION—Comprehensive compilation of welding and composition information relating to copper base alloys is presented in bulletin #D-3283, a set of 19 mimeographed sheets entitled "Weldability & Composition of 313 Copper-Base Alloys". Gives trade names, manufacturers, and chemical composition of most of established copper-base alloys together with welding information such as degree of weldability, pre-heats, type of electrodes, etc. Ampco Metal, Inc.

HOW TO DO IT

48. DIMENSION INDICATOR— Handy calculator gives general dimensions for nuts and bolts on one side and dimensions for semi-finished hexagon nuts on the other.

Simply push the calculator to the nut size and check in other columns for complete information on heavy, regular or light nuts to find weight per 1000 lbs, thickness jam, major diameter, maximum pitch diameter, etc. Grip Nut Co.

49. INDUSTRIAL LIGHTING — Published in connection with company's 45th anniversary, brochure #AD5662, handsomely illustrated, is for those interested in "behind-the-scene" portrayal of research and testing in lighting equipment. Benjamin Electric Mfg. Co.

50. SMOKE ABATEMENT— 12-page bulletin #5043 is on subject of smoke abatement and is entitled "Smoke—Its Cause, Cost and Prevention". Deals with all phases of smoke prevention and offers solution. Perfex Corp.

51. SELECTOR GUIDE— This guide answers vital questions about fire extinguishers and condenses 22 fire facts in handy vest-pocket size guide. Presents facts about suitability, maintenance and performance of soda-acid, foam, pump tank, dry power, loaded stream, carbon tetrachloride and carbon dioxide fire extinguishers. Tells how high units should be bracketed, maximum distances of extinguishers from operators, etc. Randolph Laboratories, Inc.

52. WORKMEN'S COMPENSATION— "How to Save Money on Workmen's Compensation Insurance" is 16-page compilation of case histories illustrating how a saving of 37.9% was achieved by the average of all companies using the A.S.C.S. Plan. Associated Safety and Claims Services.

53. REPRODUCTION— A reproduction process for use with metals, plastics, and plywood or pressed woods is described in bulletin entitled "Kodak Transfax". Explains use of light-sensitive solution for transferring working diagrams, legends, designs or other line work from drawing to fabricating materials. Eastman Kodak Co.

54. REMOVING BROKEN TOOLS — Bulletin, "3 Times Faster" describes method of electrical disintegration for removal of broken reamers, taps, drills and studs and its new application for die-cutting without milling, drilling or chipping. Elox Corp.

55. TIME-SAVING TOOLS— Illustrated 12-page catalog #46-1 describes time-saving tools such as vacuum-grip speed lathe for odd shaped parts that cannot be held by chuck or collet; tool post turrets equipped with cutting-off tool and holder; collet attachments; collets and surface plates. Crozier Machine Tool Co.

56. CUTTING STEELS— A new method for hand cutting or piercing stainless and stainless clad alloy steel, aluminum, bronzes and brasses, cast iron, Monel, Inconel and nickel is presented in attractive bulletin #10M-1146-CP. Cutting is achieved by combination of electric arc and stream of oxygen. Arcos Corp.

57. SPRINGS—This valuable 36-page "Handbook of Technical Data on Springs" gives clear, concise information on design formulation, load deflection, and proper methods of specifying springs. Helpful short cuts for making spring calculations given. Accurate Spring Mfg. Co.

58. FLEXIBLE COUPLINGS—57-page, semi-looseleaf engineering catalog, "Flexible Couplings" presents couplings for any service, speed or horsepower and said to eliminate backlash, wear and lubrication. Misalignment and free end float are cared for by slight bending of the discs. Various types and their applications are pictured. Thomas Flexible Coupling Co.

59. SYNTHETIC RUBBER—The "Third Report to Industry on Synthetic Rubber Insulations" discusses merits of synthetic over natural rubber in making wires and cables. Discussed are reasons for preferring synthetic rubber and answering of questions, "How suitable are they for work? and How stable will their properties be over a period of years?" Simplex Wire and Cable Co.

60. PLASTIC APRONS— Bulletin presents information about plastic film aprons for shop, laboratory, dairy, packing, bottling, canning, freezing plant workers, etc. Plastic eyelet replaces metal grommet and is fused to apron by dielectric or radio frequency heat. Said to be pliable, resilient and tough. Hydro-Tex Corp.

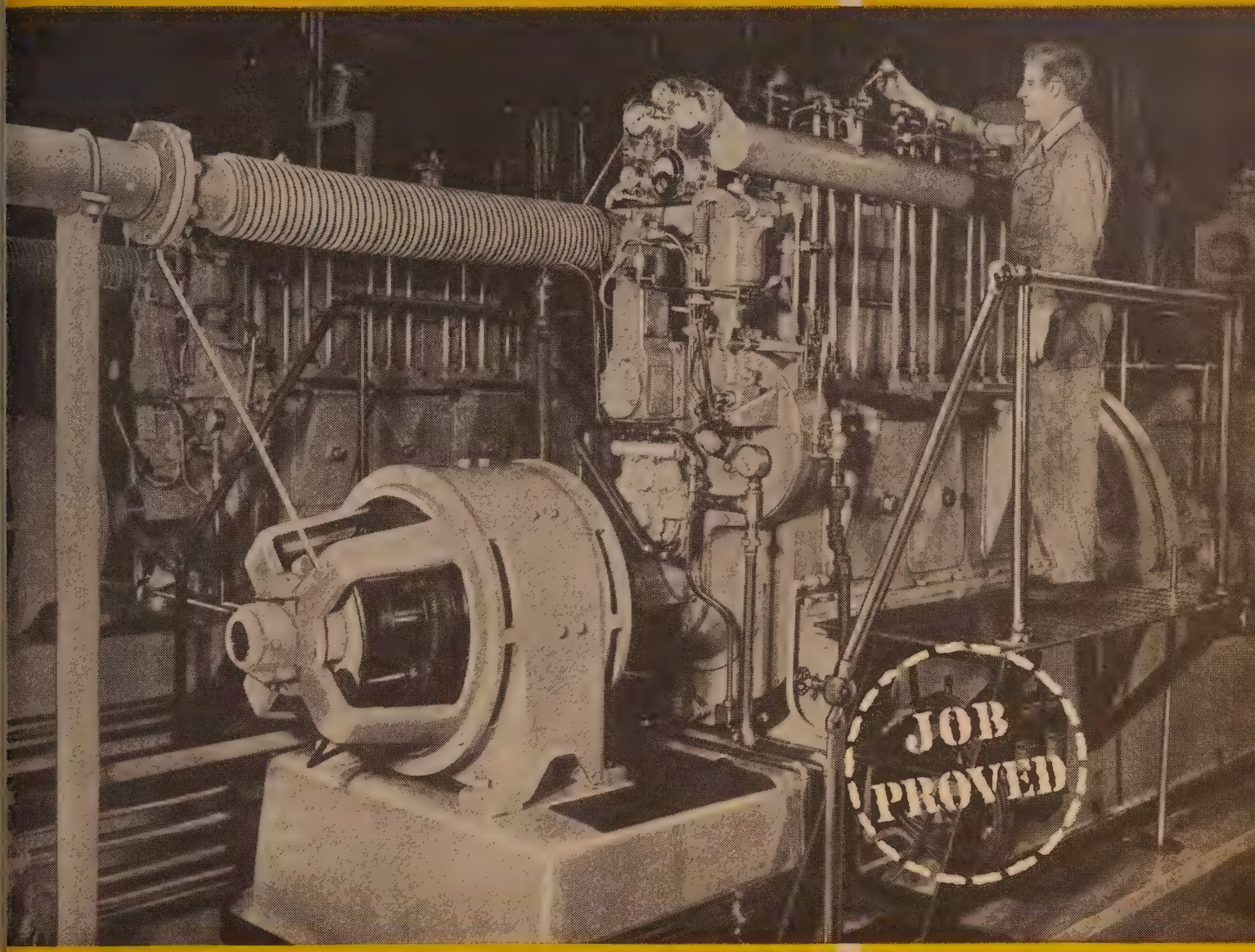
61. LIFT TRUCK— 6-page catalog entitled "The 3 Men Who Aren't There" is devoted to the motorized hydroelectric lift truck. Has detailed diagrams to illustrate the mechanical structure and dimensional specifications. Truck is said to cut operation and maintenance costs. Lift Trucks, Inc.

62. HARDENING STEEL— Bulletin #1054 describes electric furnaces designed to provide correct application of diamond block method of atmospheric control for high speed steel hardening said to be at low production cost. Arc of rugged construction with steel shells insulated for high temperature operation up to 2500°. Operating characteristics, description of method, etc., given. The Sentry Co.

63. PULVERIZERS & ATOMIZERS — Complete line of pulverizers and atomizers from small models for laboratory and pilot plant use to large capacity units for full-scale production operation is presented in handsome and well illustrated 48-page cat-

• Continued on page 168

Two Years Without Repairs, Replacement or Overhaul



SUN DIESEL LUBRICANT . . .

Keeps Two Diesels in Perfect Condition and Puts an End to Frequent Overhauls

A municipal plant which uses two 125-horsepower Diesels for pumping was confronted with a serious lubrication problem. Oil was forming sludge with the result that frequent shutdowns and overhauls were necessary.

A Sun Engineer was called in and after careful analysis recommended a Sun "Job Proved" oil specially refined to stand up under the particular operating conditions.

With Sun oil in the crankcases, the engines were kept in regular service for more than two years. Sludge disappeared. Oil consumption dropped. Mechanical repairs, replacements and overhauls were reduced to practically nothing. There was no excess carbon formation.

The ability to solve problems like this is typical of "Job Proved" products and of Sun Engineers. Wherever you have a tough problem involving petroleum products, whether in power plant, machine shop, mill or factory, call your nearest Sun office or write Department MF3.

SUN OIL COMPANY • ***Philadelphia 3, Pa.***

SUN

SUNOCO

INDUSTRIAL PRODUCTS

• Continued from page 166

alog. Basic principles and details of design and construction are presented; typical applications given. Pulverizing Machinery Co.

64. OIL FILTER—Bulletin #F-154 describes oil filters designed for high flow rates and used to purify lubricating and fuel oils used in stationary and marine Diesel engines, gas and gasoline engines and steam turbines; also to purify industrial oils used in hydraulic presses, compressors, machine tool cutting, heat treating machines, etc. The Hilliard Corp.

65. HARDNESS TESTER— Bulletin, "Hardness Tester", describes this new, portable tester which tests rounds and flats up to 1"; is accurate, fast and easy to use; weighs less than 2 lbs; is complete with penetrators, anvils, test blocks and chart for testing in Rockwell, A B & C scales. Ames Precision Machine Works.

66. THRUST LOADS— Mimeographed table on "Thrust Loads Due to Drilling Various Metals" is available. Canedy-Otto Mfg. Co.

67. DEAERATING HEATERS — Bulletin #2 describes applications and operation principles of deaerating heaters and vacuum deaerators. Former are for boiler feed purposes to remove dissolved oxygen and other gases from feed water to prevent corrosion. Latter are used to prevent corrosion at low temperatures. Liquid Conditioning Corp.

68. DOOR CONTROL— Folder, "New Type Door Control", said to close any door quickly and securely with no oiling or servicing required and to withstand most severe treatment. Unaffected by heat, cold or moisture. B. L. Mallory Co.

HOW TO DO IT

69. SHIPPING INSTRUCTIONS — Report, General Information Series #503, issued by Association of American Railroads is a "Progress Report on Glued Unit Loading System." Shippers are given specific instructions for applying glue to unitize entire carload, thus preventing lateral or lengthwise movement of containers and consequent rubbing or impacting against each other. National Adhesives.

70. STEEL NEEDLE VALVES — Bulletin #46-N concerns steel needle valves made in 3 different metals and with a wide application in oil refineries, utilities, chemical and industrial plants requiring reliable control and regulation in instrumentation and other uses. Made from stainless steel and carbon steel bar stock. Kerotest Mfg. Co.

71. PIPES & FITTINGS—Catalog section #9780 presents all of company's standard pipes and fittings lined with rubber by the Vulcalock process. Such linings said to be good protection against corrosive or abrasive action. B. F. Goodrich Co.

Check Numbers of Literature Desired and Mail Order Form

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41	42	43	44	45	46	47	48	49	50
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61	62	63	64	65	66	67	68	69	70
71									

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BIBLIOGRAPHY—"Bibliography of Industrial Engineering and Management Literature" has 136 pages listing over 1200 books and bulletins in field mentioned; over 3000 articles and papers on motion and time study and related subjects. Is comprehensive guide to recent periodical literature in field of motion and time study. Price, $3.00. Wm. C. Brown Co., 973 Main St., Dubuque, Iowa.

BOOMS & DEPRESSIONS—This excellent 1947 edition of chart, "Business Booms & Depressions", depicts periods from 1789 to 1947 with graphs and scales showing range of commodity prices, prosperity and depression eras, recovery years, etc. Price 15c. The Upson Co., Lockport, N. Y.

MACHINE DESIGN—Fifth edition of "Machine Design" by Louis J. Bradford and Paul B. Eaton incorporates progress made during last six years and eliminates portions now obsolete. Additions relate chiefly to fatigue of metals, modern ideas concerning nature of friction and lubrication, and precaution in designing parts from aluminum. Price $3.25. John Wiley & Sons, 440 Fourth Ave., New York, N. Y.

JIGS & FIXTURES—"Jigs and Fixtures for Mass Production" by Leland A. Bryant and Thomas A. Dickinson thoroughly covers subject of plastics, pneumatics and hydraulics as applied to tooling. Traces history of the subject; discusses designing and construction of jigs and fixtures, the various types, and tooling procedures. Price $3.50. Pitman Publishing Corp., 2 West 45th St., New York, N. Y.

FOOTCANDLE SELECTOR—Vest pocket Footcandle Selector indicates lighting recommendations for over 75 seeing tasks. Listed are lighting applications for industry, homes, stores, offices and schools. After selection and moving of a tiny lever until orange dot appears, an arrow will point to number on scale which is amount of light recommended. Price 10c. General Electric Co., Lamp Department, Nela Park, Cleveland 12, Ohio.

DIESEL MAINTENANCE—"Diesel Operation and Maintenance" by Orvill L. Adams is 366-page book which covers clearly and concisely the basic principles and procedures of maintenance and repair. Has valuable information on scientific, technical and related problems of Diesel engine operation. Is supplemented with line drawings, halftones, blueprints and many tables of valuable information. Price $5.00. Prentice-Hall, 70 Fifth Ave., New York 11, N. Y.

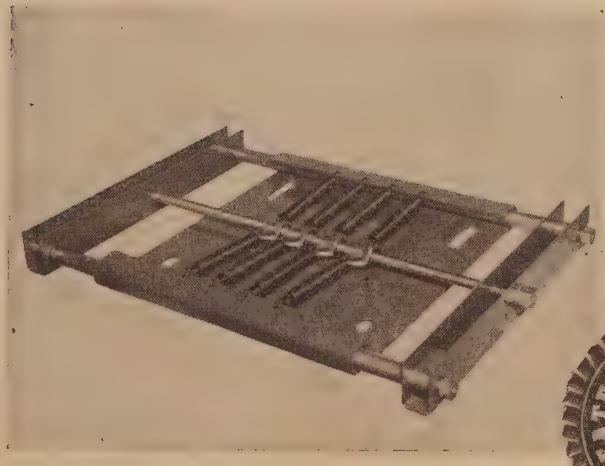
"RADIANT HEATING"— This book by P. Napier Adlam is described as "practical treatise on American and European practice in the design and installation of systems for radiant or panel heating, snow melting and radiant cooling." Describes procedures and gives typical problems solved by applying working data, charts and tables. Price $6.00. The Industrial Press, 148 Lafayette St., New York, N. Y.

PLANT EQUIPMENT PREVIEWS

Latest New Products to Reduce Costs or Increase Production

EDITORIAL BOARD AWARD

Judges' Choice For March



AUTOMATIC MOTOR BASE

Features: Its compact size and adaptability to being mounted in any position makes it practical for thousands of applications heretofore considered to be outside the scope of a variable tension motor base. The use of this equipment causes the motor to actually float against correct spring tension so that full and constant power is transmitted to the driven shaft at all times. No complicated engineering layout is necessary for installation. The motor is secured directly to the Base and together they are bolted down as a unit. After the drive is installed and running, the belt tension is adjusted merely by turning a screw.

Manufacturer: Automatic Motor Base Co., Box 2186, Paterson, N. J.

JUDGES
WILLIAM A. PARKER, Chief Engineer
Dixon Valve & Coupling Co.
M. A. CAVANAUGH, Superintendent of Plant Maintenance
The Budd Company

HOW AWARDS ARE MADE

Each month the selection board certifies for previews the new plant equipment products that appear to be most useful for the industrial plant. Their choices are taken from a wide assortment of items carefully compiled by the editors after extensive research. Their selection is based on the newness of the product, its wide application and its ability to save time and money or improve working facilities.

Continued on following pages

MARCH, 1947

PEP 2

STEEL-STRAPPING TOOL

Selection Board's Opinion: Fast and positive strapping.
Manufacturer: Acme Steel Co., 2840 Archer Ave., Chicago 8, Ill.

Features: Tool has 2 levers, one for tensioning, another seals and cuts the strap from the coil of steelstrapping. Both levers travel in an arc—the Sealer lever in an arc of just 100 degrees. Unusual speed of the tool is accounted for by the distance these levers cover. Weight: 6¾ lbs.

MARCH, 1947

PEP 3

HAND TRUCK

Selection Board's Opinion: Handles wide materials.
Manufacturer: Beall Pipe and Tank Corp., 2101 S. W. Jefferson St., Portland 1, Ore.

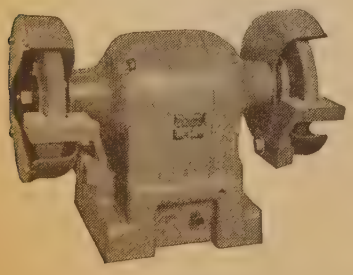
Features: Particularly convenient for handling sheet metal, plate glass, plywood, plaster board, piping, tubing, etc. The frame is made of 1½" welded aluminum tubing, light, strong and rustproof. The dimension, 55" high, 28" wide and 72" long, weighing 67 lbs. with free rolling casters of 2400 lbs. capacity, enables one man to move the frame in any direction freely.

MARCH, 1947

PEP 4

HEAVY DUTY BENCH GRINDER

Selection Board's Opinion: Should provide improved service.
Manufacturer: The Black and Decker Mfg. Co., Towson 4, Md.



Features: Styled for better service in grinding, tool sharpening, wire brushing and buffing. Streamlined housings of die-cast zinc improve working clearances and decrease weight. Strong steel wheel guards and covers give extra protection. This 6" grinder can be bolted to a bench or mounted on a pedestal that can be spotted anywhere in the shop.

MARCH, 1947

PEP 5

AC WELDER

Selection Board's Opinion: Automatic starting good.
Manufacturer: Lincoln Electric Co., Cleveland, Ohio.

Features: Equipped with the "Arc Booster" it surpasses the conventional AC welder in ease of welding, depth of penetration, range of output and economy of operation. The "Arc Booster" augments the current the instant the arc is struck. The arc is started automatically the moment the electrode touches the work.

MARCH, 1947

PEP 6

TOWING TRACTOR

Selection Board's Opinion: Highly manoeuvrable.
Manufacturer: Clark Equipment Co., Battle Creek, Mich.

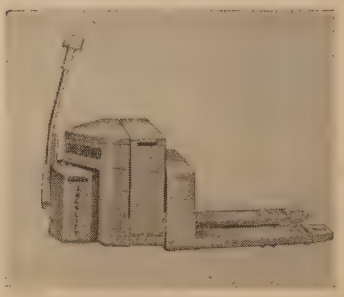
Features: This improved design has a wider steering axle, either solid or pneumatic tires front and rear; forged steel spindles; center pivoted suspension of steering axle and center control type gear operating through worm and gear sector; greater accessibility to motor and drive units and a flattened nose to provide surface for pushing loads.

MARCH, 1947

PEP 7

POWER JACKLIFT

Selection Board's Opinion: All controls in handle good.
Manufacturer: Lewis-Shepard Products Inc., 248 Walnut St., Watertown 72, Mass.



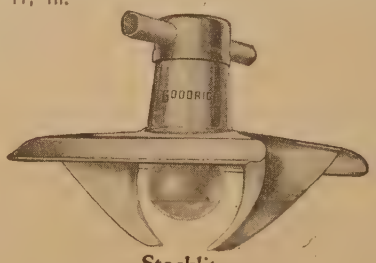
Features: Is an electrically operated hand lift truck with complete electric button operation located in the handle head. In the vertical or lowered position, the handle has a steering arc of 200 degrees, thus assuring accurate loading, lifting, spotting, etc. of loads at all times.

MARCH, 1947

PEP 8

ILLUMINATING FIXTURE

Selection Board's Opinion: Gives good distribution of light.
Manufacturer: Goodrich Electric Co., 4600 Belle Plain Ave., Chicago 41, Ill.



Stocklite

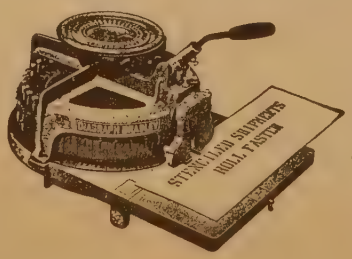
Features: For illuminating shelves and bins in narrow stock room aisles. It provides 8 different reflecting surfaces to distribute the light properly where most needed, and builds up intensities from top to bottom and on interiors. The curved V-shaped reflectors at either end eliminate glare in the aisles.

MARCH, 1947

PEP 9

CIRCULAR STENCIL-CUTTING MACHINES

Selection Board's Opinion: Fast, rotary and useful marking instrument.
Manufacturer: Diagraph-Bradley Stencil Machine Corp., St. Louis, Mo.



Features: These circular stencil cutting machines are automatically fed. They come in three sizes, the Jumbo, Model H, and Model G. Three lines can be cut on last two models and only two lines on the other. Stencil letters 1¾", 1½" and 1¼" can be cut on all three. By turning a screw, all three models can be converted to straight line stencil cutting.

• Continued on page 174

FOR FURTHER DETAILS USE CONVENIENT POSTCARD IN THIS ISSUE

HOLO-KROME *fibro forged* SOCKET SCREWS

THE BETTER FASTENING METHOD

Unseen Quality makes them stronger!

It's the uninterrupted, unbroken and unsevered fibrous structure accomplished exclusively by the Holo-Krome patented method of Completely Cold Forging . . . The results of this exclusive Holo-Krome feature is giving thousands upon thousands of Socket Screw users guaranteed unfailing performance in all types of applications - - - Specify "Holo-Krome".

Unretouched Photo Etched, Cutaway Holo-Krome Socket Head Cap Screw.

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THE HOLO-KROME SCREW CORPORATION
HARTFORD 10, CONNECTICUT

• Continued from page 172

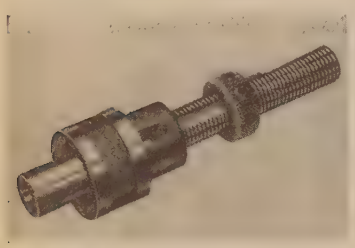
MARCH, 1947

PEP 10

TOOL HOLDER

Selection Board's Opinion: Positive drive.

Manufacturer: Burg Tool Mfg. Co., 5028 W. Jefferson Blvd., Los Angeles 16, Cal.



Features Holes only 15/16ths center to center can be tapped with this neoprene-mounted, positive drive, tool holder. It has Acme-threaded shanks for use on multiple-spindle tapping operations. Bell-mouthing and oversized holes are eliminated by the full-floated mounting. All metal parts are precision ground of heat treated, alloy steel.

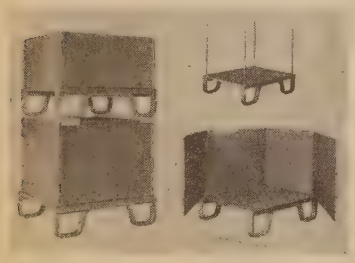
MARCH, 1947

PEP 11

COLLAPSIBLE BOXES FOR SKID PLATFORMS

Selection Board's Opinion: Versatile design.

Manufacturer: Market Forge Co., 78 Garvey St., Everett 49, Mass.



Features: The skid platforms have sockets to receive 1" standard pipe (corner posts). Panels for sectional boxes are 12" high and have loops of steel to engage with the pipe stakes in the platform. The panels when slipped over the pipe-stakes may be built to any height. The panels are all-steel and will stand a great deal of abuse.

MARCH, 1947

PEP 12

ROTARY FILES AND GROUND BURS

Selection Board's Opinion: A complete set.

Manufacturer: Nicholson File Co., Providence 1, R. I.

Features: These have 1/8" shanks. Nine standard styles are offered in either hand cut (Rotary Files) or ground from solid (Burs). Stock dimensions of heads range in sizes from 1/8" to 5/8".

MARCH, 1947

PEP 13

ROTO-FINISH MIDGET MACHINE

Selection Board's Opinion: Small and very useful.

Manufacturer: The Sturgis Products Co., Sturgis, Mich.

Features: Economizes time and labor in mechanical finishing and deburring very small parts. Cylinders are 8" wide, 12" across the flats. It has a variable drive of 35 to 70 RPM. Flats are lined with kiln dried hard maple and ends are rubber sealed.

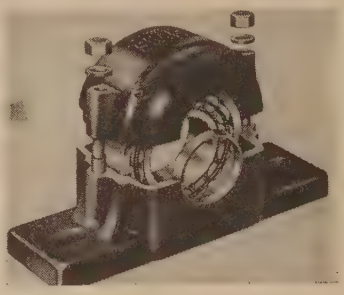
MARCH, 1947

PEP 14

SPLIT PILLOW BLOCKS

Selection Board's Opinion: Well designed for efficient use.

Manufacturer: Shafer Bearing Corp., 1412 W. Washington St., Chicago 7, Ill.



Features: The pillow blocks are designed either to locate the bearing axially or to permit float, whichever is specified. For held bearing applications, one or two locating rings are furnished, the rings being inserted between the faces of the bearing outer races and the housing shoulders. The rings are not complete circles, permitting insertion after the shaft and bearing assembly have been put in lower half of housing.

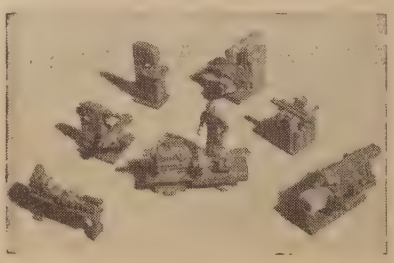
MARCH, 1947

PEP 15

SCALE MODELS AND TEMPLATES

Selection Board's Opinion: Useful for layout work.

Manufacturer: Triometric Engineering Co., 1125 Wolfendale St., Pittsburgh 12, Pa.



Features: Scale models are readily distinguishable as representative of the actual machines or equipment. Manufacturing processes can be quickly and easily studied, thus arriving at improved manufacturing methods and conditions. As much as 90% of the plant layout engineering costs can be saved by their use.

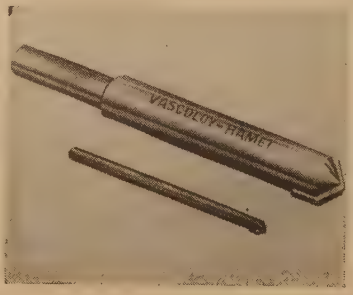
MARCH, 1947

PEP 16

CARBIDE TIPPED MASONRY DRILLS

Selection Board's Opinion: Long wearing.

Manufacturer: Vascoloy-Ramet Corp., North Chicago, Ill.



Features: Designed for non-metallic materials and constructed with generous sized carbide tips, these drills are obtainable in off-set and straight shank designs in drill diameters of .198 to 1.535". They drill masonry 75% faster than ordinary steel drills.

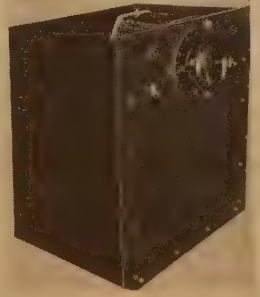
MARCH, 1947

PEP 17

D.C. POWER SUPPLY

Selection Board's Opinion: Easy to adjust output voltage.

Manufacturer: The Superior Electric Co., Bristol, Conn.



Features: Designed for continuous duty, small regulation and easily adjusted output voltage. Maximum DC output current is .5 amperes. It operates from a 115 volt, single phase, 50/60 cycle source. Power supply uses a full wave bridge rectifier consisting of four type 866/866A tubes.

• Continued on page 176

1) CAPACITY . . 30,000 LBS.
2) CAPACITY . . 10,000 LBS.
3) CAPACITY . . 15,000 LBS.
4) CAPACITY . . 12,000 LBS.
5) CAPACITY . . 2,000 LBS.
6) CAPACITY . . 7,500 LBS.
7) CAPACITY . . 4,000 LBS.

HYSTER'S 7 GUIDES TO PROFITS

Each one of the seven new Hyster industrial lift truck catalogs makes profitable reading. Between the covers of these books there are facts and pictures that will interest and excite every business man who seeks an end to the high costs of materials handling.

Fast transportation; high tiering; quick starting and stopping; maneuverability and smoothness of operation are necessary in any lift truck. Hyster has all of these plus pneumatic tires and the long life of quality engineering.

All of these catalogs point the way to Hyster materials handling savings in time—manpower—money. Copies sent on request. Ask for the ones that fit your business.

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1857 NORTH ADAMS STREET, PEORIA 1, ILLINOIS

DISTRIBUTORS IN PRINCIPAL CITIES

• Continued from page 174

MARCH, 1947

PEP 18

NON-CUSHION TYPE AIR CYLINDERS

Selection Board's Opinion: Non-cushion feature good.
Manufacturer: Modernair Corp., Oakland, Cal.

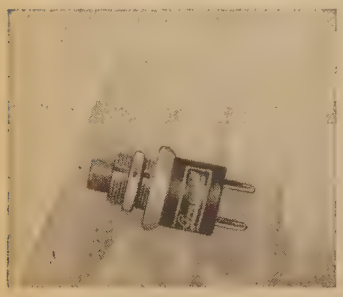
Features: Utilize threaded cylinder caps, sand cast of special aluminum alloy and properly heat treated to give high tensile strength and extreme pressure resistance. The units permit the caps to be rotated a full 350 degrees without affecting the permanence of the seal.

MARCH, 1947

PEP 19

PUSH BUTTON SWITCH

Selection Board's Opinion: Small with few movable parts.
Manufacturer: Grayhill, 1 N. Pulaski Road, Chicago 24, Ill.



Features: Makes momentary contact with automatic return. A minimum number of moving parts gives long life to the switch. As the button is depressed a bridging contact at its base closes the gap between the two solder type terminals. The round phenolic base of switch is .656" in diameter and .625" in depth. Plunger assembly protrudes .531" in front.

MARCH, 1947

PEP 20

FLEXIBLE COUPLINGS

Selection Board's Opinion: Gear-tooth arrangement gives positive contact.
Manufacturer: Industrial Machine Works Inc., Water St., S. Hanover, Mass.

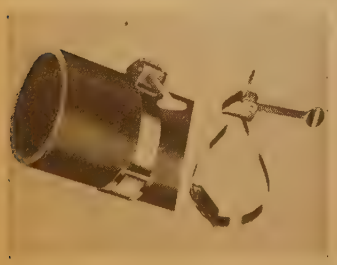
Features: Two identical end-pieces with involute teeth mate with a center-piece containing rack grooves running transversely on opposite sides. This provides simultaneous automatic correction for angular and parallel misalignment. Suitable for high speed application, these couplings have a torque capacity in standard sizes up to 1500 inch pounds.

MARCH, 1947

PEP 21

PIPE-LEAK CLAMPS

Selection Board's Opinion: Easy to make repairs.
Manufacturer: Marmon Products Co., Inc., Inglewood, Cal.



Features: Designed to stop leaks on low or high pressure pipe ranging from 1/2" to 4" size in diameter. Made of corrosion resistant stainless steel. Can withstand 800 lbs. per square inch without leaking. Come in 4 popular sizes to handle all pipe diameter to 4 inches.

MARCH, 1947

PEP 22

HAND LOTION DISPENSER

Selection Board's Opinion: Improved design.
Manufacturer: Bobrick Mfg. Corp., 1839 Blake Ave., Los Angeles 26, Cal.

Features: Useful in plant rest rooms, dispenses hand lotion in measured quantities, eliminating waste. Stainless steel internal parts eliminate danger of lotion becoming discolored or broken up.

MARCH, 1947

PEP 23

INSERT CHASER DIE HEAD

Selection Board's Opinion: Small size.
Manufacturer: Eastern Machine Screw Corp., New Haven 6, Conn.

Features: Has many applications on small screw and small tapping machines. Free cutting action results in long runs between grinds even on alloy stocks. Chasers are removable for regrinding. Die head is 1 1/8" in diameter and 1" long in 000 size and has capacity up to 1/4" diameter and in pitches from 20 to 80. Head fits No. 1 size holder with a 3/4"-24 thread.

MARCH, 1947

PEP 24

CHUCK OPERATED BY AIR CYLINDER

Selection Board's Opinion: Many uses.
Manufacturer: Erickson Tools Division, 2309 Hamilton Ave., Cleveland 14, Ohio.

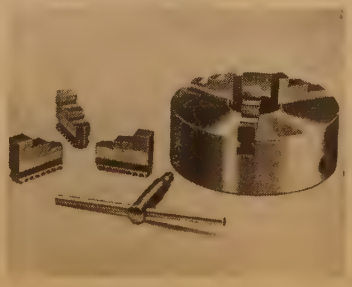
Features: Air-operated chucks achieve high degree of finish and extreme accuracy. Concentricity between individual bores and outside diameter can be held within .0005" T.I.R. and concentricity between bores to .002" T.I.R. Operator fatigue is also practically eliminated.

MARCH, 1947

PEP 25

3-JAW LATHE CHUCK

Selection Board's Opinion: Long wearing.
Manufacturer: Falls Products Inc., Genoa, Ill.



Features: Three hardened alloy pinions, instead of one, have been provided to reduce wear and eliminate search time, thus speeding production and reducing operator fatigue. The chuck is threaded to mount directly on all lathes, with 1 1/2"-8 spindle thread, but also can be adapter mounted to others.

• Continued on page 178

Thermoid – for Progress in Industry

In 1903, pipe-fed air drills like these weighed from 300 to 1500 pounds and struck from 250 to 400 blows a minute.

Today modern hose-fed jack hammers weigh only 30 to 72 pounds and strike 1800 blows per minute.

THINK of the time saved by mobility of equipment afforded by flexible, tough, abrasion-resistant Thermoid air hose over clumsy, slowly moved metal pipes.

What better picture can we give you of how Thermoid research and industrial rubber knowledge have contributed to "Progress in Industry."

Whether you operate a quarry, mine, creamery or brewery . . . are in agriculture, construction, oil or any manufacturing industry, consult your local Thermoid Jobber or direct factory representative on all problems relating to hose, belting or friction materials. When you do, you'll find—"It's Good Business to do Business with Thermoid."

THE THERMOID LINE INCLUDES: Industrial Brake Linings and Friction Products • Transmission Belting • F.H.P. and Multiple V-Belts and Drives • Conveyor Belting • Elevator Belting • Wrapped and Molded Hose.

Thermoid

THERMOID COMPANY

Trenton, New Jersey

Contributor to Industrial Advancement Since 1880

• Continued from page 176

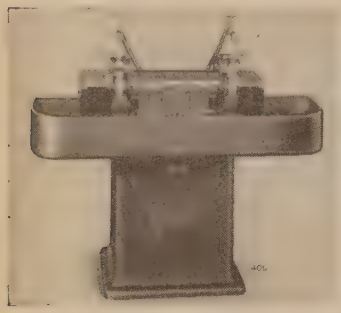
MARCH, 1947

PEP 26

WET GRINDERS

Selection Board's Opinion: Of improved design.

Manufacturer: The Hisey-Wolf Machine Co., Cincinnati 25, Ohio.



Features: Made in sizes for 10, 12, 14, 18, 20, 24, and 30 inch grinding wheels. Come as double end models or with one wheel only; also in a combination wet and dry model with one wheel for dry operation and the other for wet grinding. Machines incorporate improved bearing seals, motor mounting, settling chamber, etc. Pump is of self-priming type.

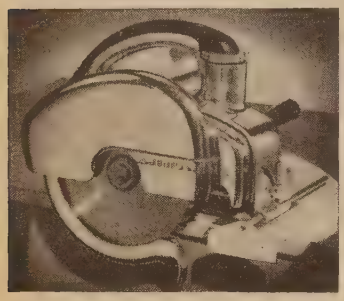
MARCH, 1947

PEP 27

PORTABLE POWER SAW

Selection Board's Opinion: Features good power.

Manufacturer: The American Floor Surfacing Machine Co., Toledo, Ohio.



Features: Delivers more power than other saws of its size due to a special electric motor developing 1½ H.P. with direct power gear drive to the 8" blade. The free running speed of 6500 R.P.M. maintains ample cutting efficiency in all types of operating conditions. The 8" blade will make a 2⅞" straight cut and saw a 2" plank with a 45 deg. angle cut.

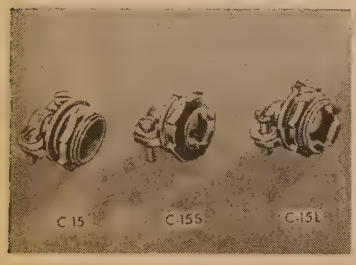
MARCH, 1947

PEP 28

CLAMP CONNECTORS

Selection Board's Opinion: Good adjustment and clampage.

Manufacturer: Gedney Electric Co., 1270 Sixth Ave., New York 20, N. Y.



Features: Provide a single type of fitting capable of terminating practically any kind of cable or cord in a standard ½" K.O. Two screw clamping yields uniform pressure on the surface of the cable and is easier to install because the metal clamp need not be forced to conform to the circumference of cable.

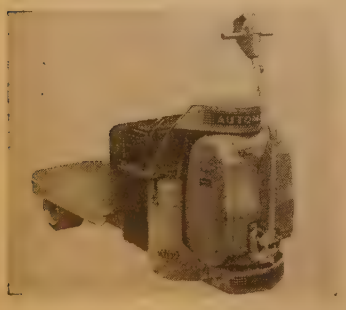
MARCH, 1947

PEP 29

LIFT TRUCK

Selection Board's Opinion: Lightweight.

Manufacturer: Automatic Transportation Co., 149 W. 87th St., Chicago 20, Ill.



Features: This fast and simple operated motorized hand truck incorporates an electric lift and a double position brake. The latter is applied either by raising or lowering the guide handle. A combination of these features with one-hand control enables an operator to guide the truck into a skid or pallet, brake the truck, lift the load and reverse direction in one motion.

MARCH, 1947

PEP 30

AUGER BIT SET

Selection Board's Opinion: Complete and should save tool costs.

Manufacturer: Bruno Tools, 9330 Santa Monica Blvd., Beverly Hills, Cal.

Features: Designed for fast, easy wood-boring, is of two models both with an 8¼" shank. One set contains 6 boring heads, ⅝" to 1¼" by eighths; the other contains 11 boring heads from ⅝" to 1¼" by sixteenths.

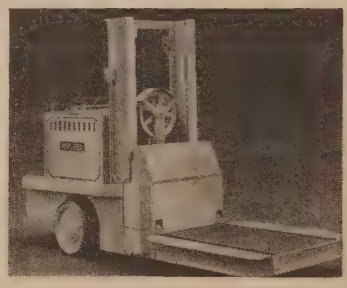
MARCH, 1947

PEP 31

DIE HANDLER ASSEMBLY

Selection Board's Opinion: Easy means of handling dies.

Manufacturer: The Mercury Mfg. Co., Chicago, Ill.



Features: The assembly is built into a 5-ton high lift chassis, but can be also furnished on a 3-ton high or low lift chassis model. It is designed with 2 power driven die movers, operating in machined slots at the sides of the load platform. Independent control is effected by 2 push buttons, conveniently located on the operator's dash.

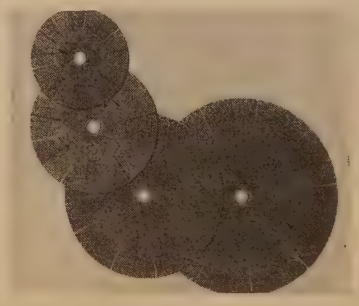
MARCH, 1947

PEP 32

RIPPER CUT-OFF WHEEL

Selection Board's Opinion: Cuts cooler and faster.

Manufacturer: American Emery Wheel Works, Richmond Square, Providence, R. I.



Features: A "set" allows it to cut cooler and faster and last longer. The sides of the wheel are made with radial depressions .006" to .008" deep, extending from the flange area to the edge of the wheel. Minimum thickness of wheel is 1/16" in 6", 3/32" in 8", 10" and 12" sizes.

MARCH, 1947

PEP 33

MIDGET CARBIDE GRINDING WHEELS

Selection Board's Opinion: Long wearing.

Manufacturer: Raymac Co., 3729 Cass Ave., Detroit 1, Mich.

Features: These midget solid tungsten carbide grinding wheels are for use in grinding holes that could not be satisfactorily finished with abrasives. Wheels are standardized from .030" to 0.250". The company also makes small carbide reamers standardized in sizes from .035" to 0.250".

• Continued on page 180

IT'S TIME TO TURN TO . . .

Threadwell COLD-TEMPER TAPS . . . FOR ALL PRODUCTION TAPPING OF CAST IRON, STEELS, ALLOYS AND PLASTICS

Threadwell Screw Plates with [illegible] equipped with individual pressed steel [illegible] assure perfectly straight threads. Stock has [illegible] adjustment for cutting standard, oversize or undersize threads as desired. Write for Bulletin.

Threadwell High Speed Counterbores assure fast production and long life. Two cutting lips, with spiral flutes for ample clearance and strength. Easily sharpened. Non-chattering. With straight or taper shanks. For fillister head screws or for spot facing. Write for Bulletin.

Threadwell COLD-TEMPER Taps are *deep-freeze* treated at 120° below zero. The result — more and better threads per tap. They're ideal for tapping abrasive materials.

Other distinctive Threadwell Tap features are *polished flutes* that reduce chip clogging and breakage — *greaseless rust-proofing* to keep them bright and shining and easy to handle — *color i-dot-ification*, *red* dot on the shank for cut thread, *white* dot for commercial ground, *blue* dot for precision ground — *tap-capsule*, a neat, transparent plastic tube for each ground thread tap to keep it clean and sharp and permit ready selection without unwrapping.

SOLD EXCLUSIVELY BY MILL SUPPLY DISTRIBUTORS THROUGHOUT THE UNITED STATES AND THE WORLD

Threadwell "TAPS OF DISTINCTION"

THREADWELL TAP AND DIE COMPANY • GREENFIELD, MASSACHUSETTS, U. S. A.

CALIFORNIA OFFICE, THREADWELL TAP & DIE CO. OF CALIF., 1322 SANTA FE AVE., LOS ANGELES 21

• Continued from page 178

MARCH, 1947

PEP 34

SAFETY SWITCHES

Selection Board's Opinion: Of good design.

Manufacturer: The Wadsworth Electric Mfg. Co., Covington, Ky.

Features: These front-operated general duty safety switches can be used where space is limited. Built of few parts they withstand the "Offs" and "Ons" of daily operation. Cabinet is neatly designed small, yet large enough to permit wiring without removing the rigidly installed mechanism.

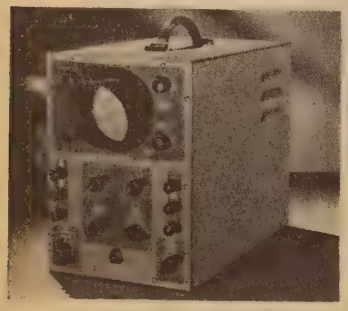
MARCH, 1947

PEP 35

CATHODE RAY OSCILLOSCOPE

Selection Board's Opinion: Many industrial uses.

Manufacturer: Sylvania Electric Products Inc., 500 Fifth Ave., New York 18, N. Y.



Features: Designed for radio set servicing and general applications. Weighs only 18 lbs. and measures 10¾" high x 8⅛" x 13¾" deep. Signal frequency range from 15 to 40,000 cycles is provided with a 5 range selection control. Visual study of wave form is provided by a 3" cathode ray tube designed for 650 volt deflection plate operation.

MARCH, 1947

PEP 36

TRAILER TRUCK

Selection Board's Opinion: Many possible uses.

Manufacturer: Phillips Mine and Mill Supply Co., Pittsburgh, Pa.

Features: Completely equipped with pneumatic tires, and a center caster is optional for greater maneuverability, ease in handling and faster haulage and dumping. The construction includes the roll-over type body, chain release, and quick return to normal position.

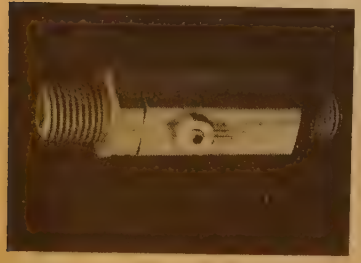
MARCH, 1947

PEP 37

SPEED CONTROL VALVE

Selection Board's Opinion: Precise control.

Manufacturer: Electrol Inc., Kingston, N. Y.



Features: Incorporates a new metering device. While allowing free flow in one direction, it controls precisely the flow in the opposite direction, by means of a metering pin rather than by regulation through the main orifice. The flow in opposite direction can be changed as desired by the adjustment of the screw actuated metering pin. Sizes: ⅛", ¼", ⅜", and ½".

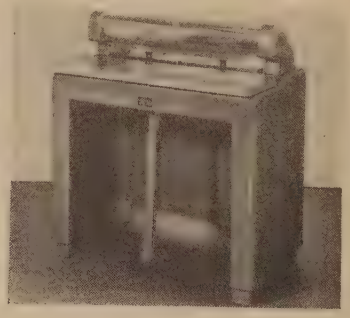
MARCH, 1947

PEP 38

PLASTIC SHEET-CREASER

Selection Board's Opinion: Quick method of forming.

Manufacturer: Taber Instrument Co., N. Tonawanda, N. Y.



Features: Forms 90 degree creases or folds with repetitive uniformity on 5-20pt. thermoplastic sheeting up to 30" maximum width used in making square set-up boxes and other type transparent novelties and other items requiring right angle creasing or folding.

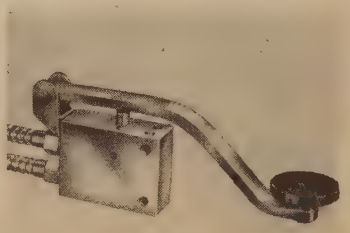
MARCH, 1947

PEP 39

"FINGERTIP" VALVE

Selection Board's Opinion: Provides accurate and easy control of air.

Manufacturer: Mead Specialties Co., Chicago, Ill.



Features: This precision-built 3-way valve is compact, neat and sensitive. Gives fast action to cylinders up to 4" bore or more. Because of its compact size and ease of attachment, this valve is ideal to synchronize with the action of a drill press, milling machine, etc. By means of a simple cam, an automatic cycle can be set up for many types of work.

MARCH, 1947

PEP 40

MICROMET FEEDERS

Selection Board's Opinion: Should help eliminate many water troubles.

Manufacturer: Calgon Inc., Pittsburgh, Pa.

Features: Designed for commercial, institutional or industrial establishments having corrosion or scale water troubles. The chemical can be fed into the water lines at low cost and with simplicity. The chemical dissolves slowly at rate of 25% per month so only that much of initial charge has to be renewed each month. Amount of chemical required depends on type of water trouble and amount of water.

MARCH, 1947

PEP 41

INDEX TABLE

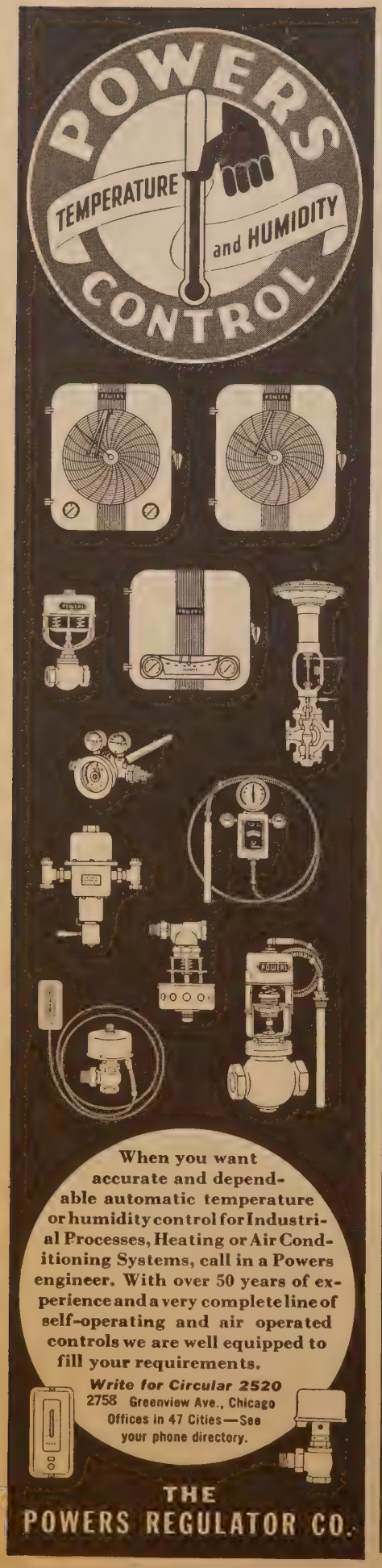
Selection Board's Opinion: Facilitates fast indexing.

Manufacturer: Robbins Engineering Co., 318 Midland Ave., Detroit, Mich.

Features: Useful for fast accurate indexing on a wide variety of production operations. The table is indexed manually —located automatically. All wearing parts are hardened and ground for maximum life and are concealed from dirt, chips, abrasives, etc. The index table and base are ribbed for extra strength.

• Continued on page 188

Ample Stocks
OF J&L PRECISIONBILT WIRE ROPE
FOR IMMEDIATE DELIVERY
FROM YOUR J&L WAREHOUSE
CHICAGO • CINCINNATI • DENVER • DETROIT
HOUSTON • MEMPHIS • MINNEAPOLIS • NEW ORLEANS
NEW YORK • PHILADELPHIA • PITTSBURGH
SAVANNAH • SAN FRANCISCO
JONES & LAUGHLIN STEEL CORPORATION
PITTSBURGH 30, PA.
J&L STEEL


POWERS
TEMPERATURE and HUMIDITY CONTROL
When you want accurate and dependable automatic temperature or humidity control for Industrial Processes, Heating or Air Conditioning Systems, call in a Powers engineer. With over 50 years of experience and a very complete line of self-operating and air operated controls we are well equipped to fill your requirements.
Write for Circular 2520
2758 Greenview Ave., Chicago
Offices in 47 Cities—See your phone directory.
THE POWERS REGULATOR CO.

Small Plant Maintenance

(*Continued from page 106*)

when the card system was set up, and a comparison of the cost for replacement of bearings and other machine parts before and after the system was established clearly showed that the system paid for itself within a year. Added to this was the fact that when replacement of personnel was necessary, one week's training was adequate as compared with the several months required before the color code was in operation.

In other phases of maintenance operation the fact that the plant was newly constructed made some functions relatively easy, but complicated others. For instance, while there was no problem with old installations, or failure of equipment because of over-age or overuse, constant changes were necessary in the over-all plant layout and equipment to keep up with production specifications and revisions shown to be necessary by experience and careful planning.

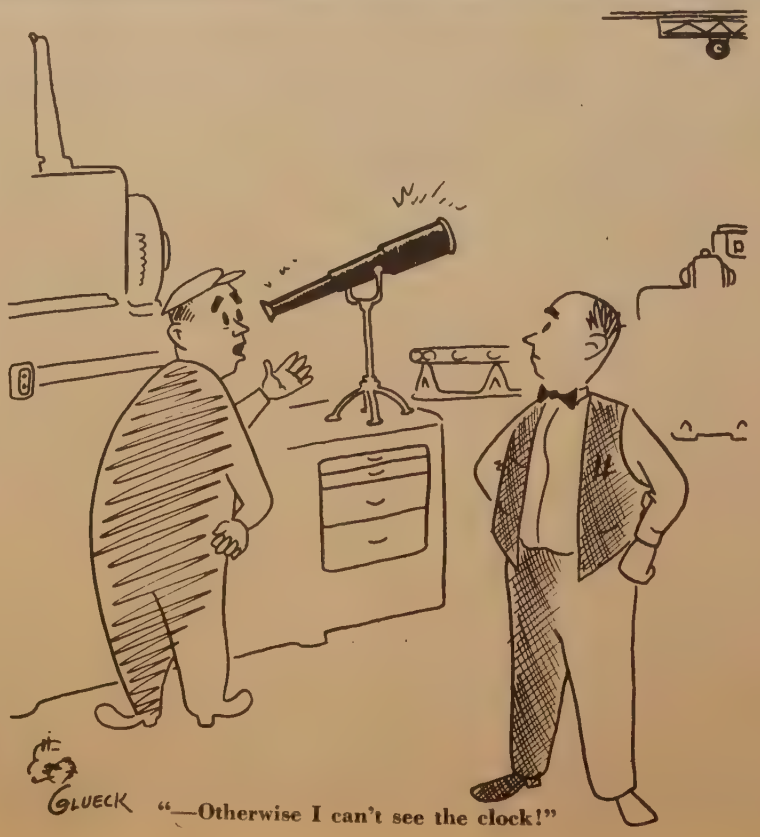
To do this, an average maintenance force of 24 persons, in addition to supervisory personnel, was maintained. Specifically, it consisted of two Class A electricians, an electrician's helper, a Class A plumber and steamfitter, a Class A welder, a Class A carpenter, two maintenance painters, an auto mechanic, an oiler and belt lacer, a gardener, two general trades helpers, two Class A toolmakers, two Class B toolmakers, a Class A machinist and machine repair man, a Class B machinist and machine repair man, five porters and two matrons. In addition to these, there were four boiler attendants whose primary function was to operate the two low-pressure boilers, but who were directly responsible for the maintenance of them as an incidental part of the job.

The entire crew, of course, was under the direct supervision of a maintenance foreman, whose full time job was directing their activities to see that all plant equipment functioned properly.

Being a small plant, it was obviously necessary for a high degree of cooperation between the various tradesmen since it was often necessary to ask a plumber, for example, or an electrician to cooperate and assist one another while a major installation was going on.

In line with the usual practice, the maintenance crew at Fort Edward had the responsibility of keeping the plant clean, although the foreman of a particular section was in charge of the cleaning of his area. Porters and matrons were assigned to the production foreman

(*Continued on page 186*)



"—Otherwise I can't see the clock!"

DAYTON COG-BELTS

The Premium V-Belt

Built specifically for use on drives demanding maximum *compactness* with smallest possible pulleys . . . shortest centers

Yes, they're here . . . the new, premium Dayton Cog-Belts, successor to the famous Dayton Cog-Belts that made power transmission history on the toughest industrial drives in the United States and twenty-seven foreign countries.

Incorporating all the features of the original Dayton Cog-Belt, this new premium V-Belt offers additional advantages gained by the use of war-born materials and developments . . . including *Raytex Fortified Rayon Cords . . . cords that practically eliminate belt stretch, that provide greater flex strength and greatly increased V-Belt life . . . on the smallest pulleys.

The new Dayton Cog-Belt is a premium V-Belt designed and built especially for V-to-V or V-Flat drives that demand:

SMALLER PULLEYS—Because of their exclusive preformed and true cog construction with die-cut sides, Dayton Cog-Belts *flow* easily, naturally, around substandard pulleys while providing undistorted maximum contact arc.

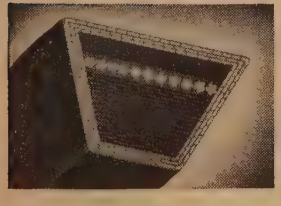
SHORTER CENTERS—Because smaller pulleys can be used, the distance between the motor and driven machine can also be shortened with proper V-Belt contact arc.

The new Dayton Cog-Belt is now in production in many sizes. It is a premium belt at a premium price, built especially for use on drives where maximum compactness with smallest pulleys and shortest centers is essential. For complete information, call your Dayton V-Belt Distributor.

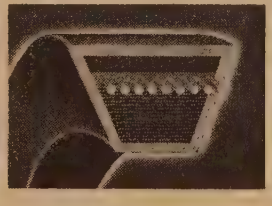
DAYTON RUBBER • DAYTON, OHIO

Branch Offices: Atlanta • Boston • Chicago • Cincinnati Cleveland • Dallas • Dayton • Detroit • Los Angeles Minneapolis • New York • Philadelphia • St. Louis

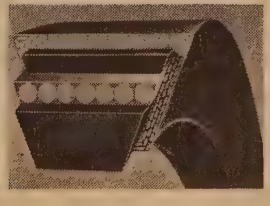
A COMPLETE V-BELT LINE FOR EVERY POWER NEED



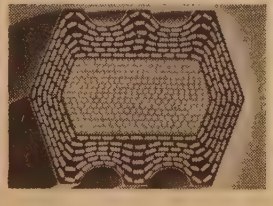
DAYTON THOROBRED V-BELT. For the millions of industrial applications using regular pulley diameters.



DAYTON STEEL CABLE V-BELT. For those unusual power transmission jobs that demand maximum pull.



DAYTON O-H-S V-BELT. For drives where extreme conditions of Oil, Heat and Static are present.



DAYTON DOUBLE ANGLE V-BELT. Where power needs must be taken from both sides of the belt.

CONNECTOR TYPE V-BELT. Permits V-Belt advantages where endless V-Belts cannot be applied.

Rubber

EXCELLENCE IN NATURAL AND SYNTHETIC RUBBER

MANUFACTURER OF V-BELTS

HOLD THE EDGE IN WEAR
GIVE THE EDGE IN VALUE

Moly **Super Alloy Grade, Premium Price Shovels of *final cost economy.*** Mo-lyb-den-um Alloy Steel Blades, heat treated, Brinell tested. XX Grade Northern White Ash Handles, smoothly sanded, thoroughly waxed. ***Unconditionally Guaranteed! . . .*** to outwear any other shovels made.

STUART **The standard of Quality Comparison among all popular price shovels.** High Carbon Steel Blades, heat treated. Quality X Grade Handles, smoothly sanded and thoroughly waxed.

WILSON **The undisputed *Quality Leader* among all lowest price shovels.** Carbon Steel Blades, heat treated. Serviceable No. 1 Grade Handles, smoothly sanded, thoroughly waxed.

Guaranteed!
12 PERFECT SHOVELS TO EVERY DOZEN

***Buyers Digest . . .* of Exclusive Construction Features**

- Closed back and open back types supplied with exclusive, patented Steel I-Beam Handle Reinforcement.
- D handle types equipped with patented Moly D Handle . . . the strongest, most comfortable handle made.
- Steel in all blades made to special specifications, developed by Wood Shovel engineers.

THE WOOD SHOVEL AND TOOL CO., *Piqua, Ohio*

A National Organization Specializing Exclusively in
SHOVELS SPADES SCOOPS

Small Plant Maintenance

(*Continued from page 182*)

for day-to-day direction of their activities.

This system provided a considerable degree of uniformity and control in the use of the cleaning equipment, and at the same time made it possible for each foreman to guide the men in the particular details for his section. By having them all coordinated by one person it was always possible to draw together three, four, or five men for a particularly heavy project.

Theoretically, the amount of equipment required for a maintenance job of this size would require an area of approximately 3000 sq. ft. of space. Limitations occurring at the time, however, made only one maintenance room 40 by 40 feet available. The plumber, electricians, carpenter, and welder worked in this room. A large tool room used in the making of dies and fixtures for production work was also used by the maintenance machinists.

Maintenance Tool Room

Although such limited facilities served the purpose during the war period, they are being improved as part of the general reconversion program, so that the maintenance tool room will be combined with that of the other skilled trades. In this room attempts will be made to provide the best and most suitable accommodations possible, and to embody the facts learned during the war period. The equipment to be installed here will probably include, for the carpenter, a band saw with 16-inch throat, a 10-inch circular saw, a 14-inch disc and belt sander, a hand sander and a joiner with six-inch cutter. Welding equipment will include an acetylene welding and cutting set, an electric arc welding set, a welding booth, and miscellaneous forming devices.

Extensive equipment is planned for the toolmakers, including four lathes of various sizes; four grinders; five drill presses; a shaper, a miller, and two utility saws.

The plumber, in addition to a two-inch maximum pipe threader, will be provided with the usual small tools necessary for his duties, as will the electricians and auto mechanic.

The tool room equipment, and the personnel required to operate it would be excessive for any other shop, of course, if it was not engaged in highly precisioned work.

NATURE HAS Sharper TEETH

A manufacturer of metal equipment in the Midwest was desperate. Rust and corrosion, like a horde of rats, were gnawing away at a hundred-thousand dollars worth of hand tools in his machine shop.

This company's chemists experimented with one precautionary measure after another—yet nothing stopped nature's rampage.

When one of our lubrication engineers was consulted, he informed the company that the Cities Service research laboratories had recently perfected, after years of development, a remarkably effective rust preventive (called Anti-Corrode). It was given exhaustive tests at once and the chemists soon reported rust and corrosion were stopped dead. From that point on, everything down to and including pliers and screw drivers was coated with Anti-Corrode.

Cities Service serves *all* industries with hundreds of quality products from our refineries and research laboratories. And, like our good friends above, the many, many companies which we serve have found that . . .

CITIES SERVICE OIL COMPANY
SIXTY WALL TOWER, NEW YORK 5, N. Y., ROOM 26

I would like a free demonstration of your rust-preventive and rust-removal products, at no obligation.

NAME _____

TITLE _____

FIRM _____

ADDRESS _____

CITY _____ **STATE** _____

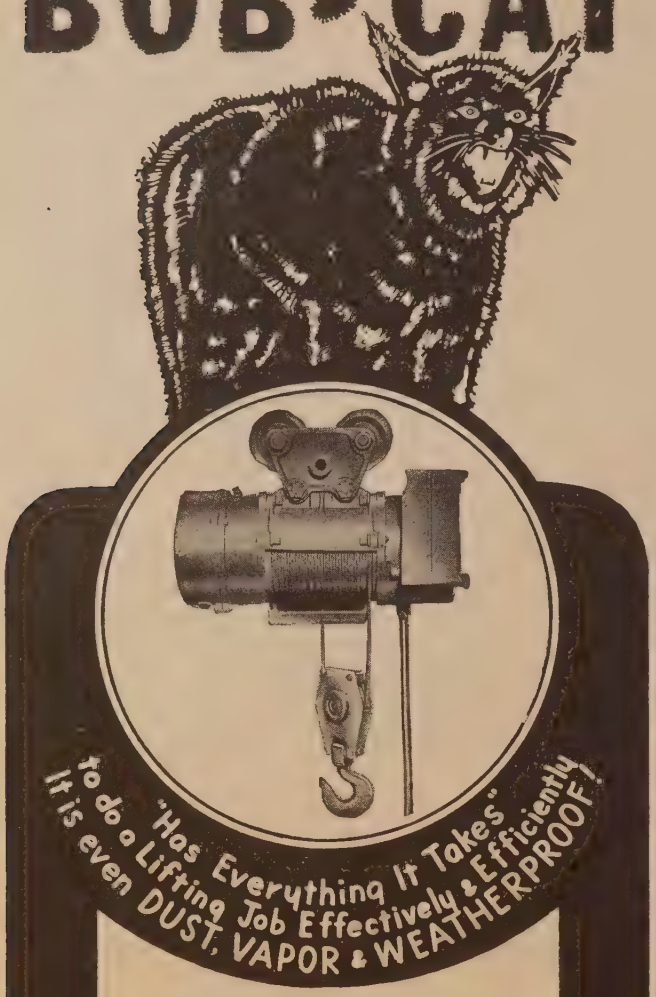
(This offer available only in Cities Service marketing territories East of the Rockies.)

Cities Service means Great Service

—ALL THE WAY FROM THE REFINERY TO YOUR PLANT

CITIES SERVICE

The BOB-CAT



ITS EXCEEDINGLY LIGHT WEIGHT

plus

ITS PHENOMENAL STRENGTH

are due to its unique scientific design such as the motor being located inside the wire rope drum and the simplicity of design of gear train,—saving about 200 lbs. over any other high grade electric hoist.

This light weight plus the scientific designing assures you much less effort to move the Trolley along the Beam.

It has two Weston Mechanical Brakes on the Planet Gears which also reduces the unit pressure and wear.

The BOB-CAT will lick any lifting problems you have.

Give it your roughest tryout. . . . . Ask your Jobber or Mill Supplier.

LISBON HOIST & CRANE COMPANY

PIONEERS OF BETTER HOISTS & LIFTING AND CONVEYING EQUIPMENT

DIVISION OF THE WRIGHT FILE CO.
LISBON, OHIO

Plant Equipment Previews

(*Continued from page 180*)

MARCH, 1947
PEP 42

HEATER BRICKS

Selection Board's Opinion: Glazed surface a good feature.

Manufacturer: General Ceramics and Steatite Corp., Keasbey, N. J.

Features: For use in electric stoves, grills and hot plates, these bricks are available in 4 lustrous colors with all exposed surfaces highly glazed, making it difficult for dirt etc. to adhere to the surface.

MARCH, 1947
PEP 43

LAMP SOCKET AND STARTER COMBINATION

Selection Board's Opinion: Quick assembly is good feature.

Manufacturer: Lasser Mfg. Co., 40 N.E. 22nd St., Miami, Fla.

Features: The lamp socket has sure-grip terminals and the starter features a positive, turn-lock action. Both lamp socket and starter are firmly gripped so that even severe shock cannot shake them loose. The socket is designed for easy wiring into fixtures to save assembly time.

MARCH, 1947
PEP 44

GOGGLE

Selection Board's Opinion: Easy to use and remove from eye.

Manufacturer: Chicago Eye Shield Co., 2304 Warren Blvd., Chicago 12, Ill.

Features: A new speed-shift goggle mounted on a comfortable plastic headgear. A quick flip of one hand moves the goggle

(*Continued on page 190*)

HERE'S SOMETHING *NEW* IN TOOL KITS TO SAVE YOU *Minutes* AND *Money!*

"MINUTE MAN" KEYWAY BROACHES
HAND OPERATED
A tool of simplicity . . . designed to cut effectively and accurately keyways in pulleys, gears, collars, and kindred parts. The Cutters have a 7° rake for use in cast iron or steel. When being used in soft materials remove the rake to prevent "biting".
Bushings are supplied for various diameter holes and with the combination of cutter bars (broaches), or more commonly known as Keyway Cutters, a large number of different size keyways can be cut. The "MINUTE MAN" Cutter is all that the name implies, as a complete keyway can be cut in 60 seconds or less.
Send for complete catalog and manual of operation.
THE du MONT CORPORATION, Greenfield, Mass., U.S.A.
"Precision Products of Sterling Quality"
1/2
5/8
3/4
7/8
1
1 1/8
1 1/4
1 3/8
1 1/2

duMONT'S *Minute Man* KEYWAY BROACH KIT

Think how often you have keyways to cut in gears, milling cutters, pulley hubs, collars, couplings, etc.

With this *Minute Man* Set you can cut any standard width, any depth keyway *in one minute!* You simply select the right bushing for the bore, insert the broach in the bushing slot, place it under the arbor press and press it through, using a shim and second pass to get the exact depth desired. It's done in a tiny fraction of the time it would take to set up a machine for the job. Broaches, shims, bushings, keyway stock are all right there in the set.

Minute Man Keyway Broaches and Kits are sold only through Mill Supply Distributors.

Let us mail you the name of the nearest distributor together with our new Catalog "F" containing complete information and prices on all sizes of Broaches and Kits and a lot of valuable reference information.

The du MONT CORPORATION

GREENFIELD, MASSACHUSETTS

The Diamo-Carbo* dresser is loaded and aimed at top efficiency

YOU CAN save money and get better results on many jobs by using this DIAMO-CARBO dresser in place of diamond tools or common Huntington dressers. For instance, in forming special shaped wheels, turning delicate edges or turning all wheels up to "hard" grade, the DIAMO-CARBO is tops. Its long steel tube is packed with an extremely hard abrasive. Keep the tube ground back about ⅛th inch from the abrasive, support it on a tool test and roll back and forth lightly across the wheel face.

Only Desmond makes the DIAMO-CARBO dresser, and *only* Desmond makes a complete line of dressing tools. So, whatever your requirements, ask your distributor for Desmond dressers by name and be sure of getting *the right tool for the job.*

Write today for the complete Desmond catalog.

THE DESMOND-STEPHAN MFG. COMPANY • URBANA, OHIO

* *Patented*

Desmond

the only complete line of grinding wheel

DRESSERS & CUTTERS

BALL BEARING DRESSERS

REVOLVING CUTTER TYPE DRESSERS

DIAMOND HAND TOOLS AND NIBS

WHEEL TYPE DRESSERS

SIMPLEX STEEL-SLIDE VISES

Plant Equipment Previews

(*Continued from page 188*)

in and out of position. This goggle does not interfere with the wearer's own glasses, and it is adjustable to individual facial requirements.

MARCH, 1947
PEP 45

HAND EXTINGUISHER

Selection Board's Opinion: Quick, efficient and easy to use.

Manufacturer: Union Stop-Fire Co., Brooklyn, N. Y.

Features: As easy to use as a garden hose. The user has only to point it at the fire and give the readily accessible valve a quick flick with the finger when an instantaneous stream of fluid is released. Has a range of from 15' to 25'. Being manufactured of 85-15 brass the extinguisher is non-corrosive and not subject to zinc oxidation.

MARCH, 1947
PEP 46

ROLLER CHAIN ELECTRIC HOISTS

Selection Board's Opinion: Versatile units.

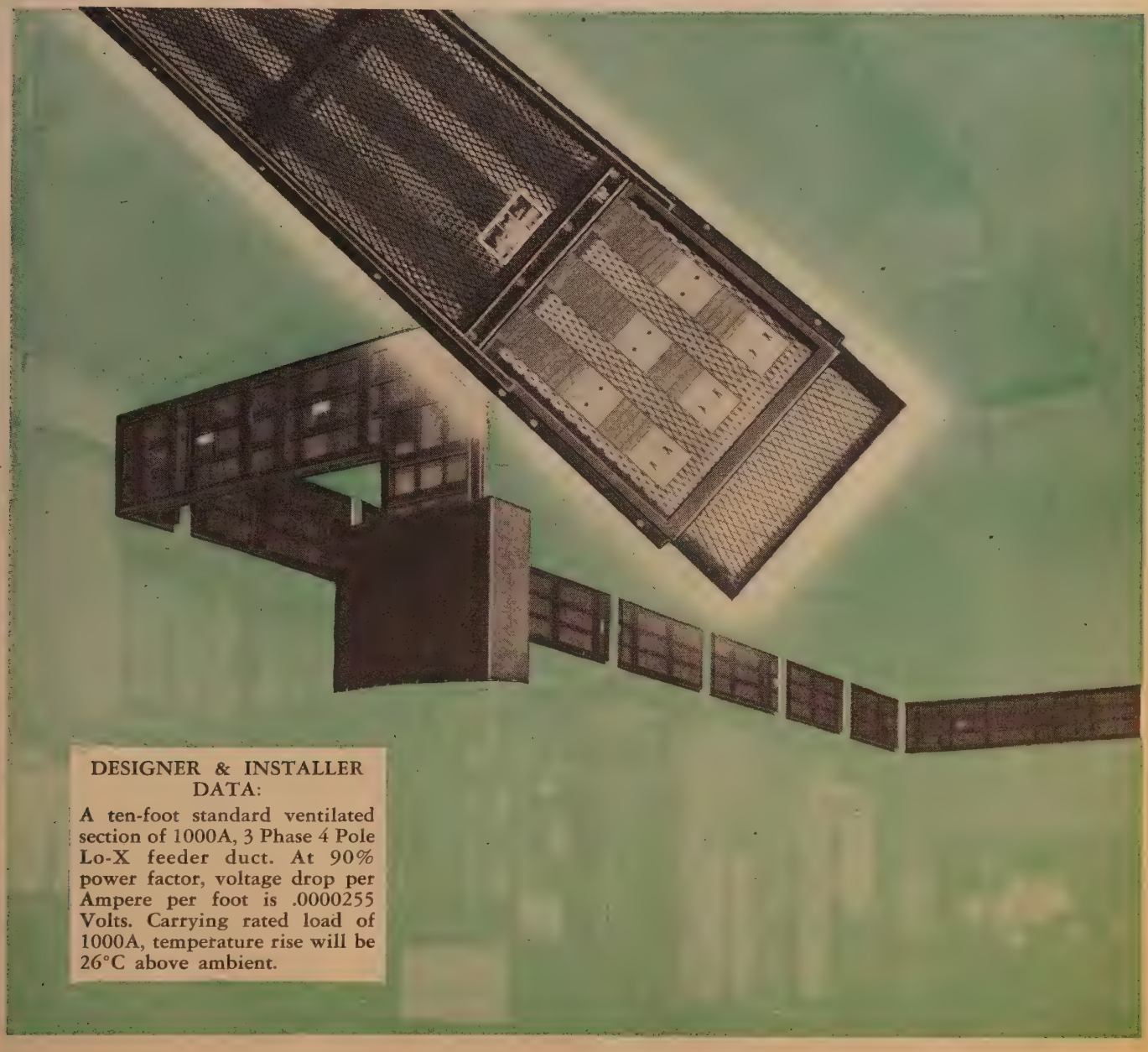
Manufacturer: The Whiting Corp., 15656 Lathrop Ave., Harvey, Ill.

Features: Of ¼, ½, and 1-ton capacity respectively these cranes are light enough for one man to install and move them with-

(*Continued on page 192*)

Get the drop on voltage drop

with BullDog Lo-X BUStribution DUCT



DESIGNER & INSTALLER DATA:

A ten-foot standard ventilated section of 1000A, 3 Phase 4 Pole Lo-X feeder duct. At 90% power factor, voltage drop per Ampere per foot is .0000255 Volts. Carrying rated load of 1000A, temperature rise will be 26°C above ambient.

VOLTAGE drop can be figured—and so can temperature rise—even before your feeder system is installed.

The answer to these critical power distribution problems lies in BullDog Ventilated Lo-X BUStribution DUCT. And what do these problems mean to you? Just this:

1 Underpowered equipment can't operate efficiently. At ten percent under voltage, induction motors have *19%* less maximum running torque. And incandescent lights yield *30%* less illumination!

2 High temperatures shorten the life of your distribution system and needlessly increase electrical costs.

What to do about it:

Be sure that your operating voltages and temperatures are curbed to insure peak performance by specifying BullDog Ventilated Lo-X BUStribution DUCT. Unique, superior design minimizes voltage drop and temperature rise. Prefabrication makes it possible to predetermine both factors.

Call a BullDog Field Engineer for full information. Or, write BullDog direct for descriptive literature.

• • •

BullDog manufactures Vacu-Break Safety Switches—SafToFuse Panelboards—Superba and Rocker Type Lighting Panels—Switchboards—Circuit Master Breakers—"Lo-X" Feeder BUStribution DUCT—"Plug-in" Type BUStribution DUCT—Universal Trol-E-Duct for flexible lighting—Industrial Trol-E-Duct for portable tools, cranes, hoists.

Detroit 32, Mich. Field Offices In All Principal Cities. In Canada: BullDog Electric Products of Canada, Limited, Toronto

ADEQUATE WIRING SERVES AND SAVES

BULLDOG

ELECTRIC PRODUCTS COMPANY

INSTANT, DIRECT Temperature Readings Accurate to within a Fraction of a Scale Division with

XACTEMP

Trade Mark Reg. U. S. Pat. Off.

HAND PYROMETERS

Specify XACTEMP PYROMETERS wherever a quick, accurate temperature determination is needed. Used for surface temperatures of welds, welded rail ends, billets, slabs, heated rollers, forgings, ovens, hot plates, furnace walls—for general inspection in furnaces, lead and salt pots, galvanizing tanks, core ovens, type metal, etc. Long-life cast aluminum and brass construction. Medium resistance, fast-acting indicator, provided with Alnico V magnet—direct reading dial starts at 50° F. or 60° F. Simple, easy to operate—no adjustments necessary—always ready for use. Will take most types of thermocouples. A full line of thermocouples available from stock.

FOUR MODELS

Catalog No.	Range	Thermocouple
LT 800	60-800 F.	Iron-Constantan
LT 810	60-1200 F.	Iron-Constantan
LT 820	60-1600 F.	Iron-Constantan
LT 830	50-2500 F.	Chromel-Alumel

PRICE WITHOUT THERMOCOUPLE $39.50

Ask also about XACTEMP PYROMETERS for taking temperatures of molten non-ferrous metals

GORDON SERVICE

CLAUD S. GORDON CO.

Specialists for 33 Years in the Heat Treating and Temperature Control Field

Dept. 28 • 3000 South Wallace St., Chicago 16, Ill.
Dept. 28 • 7016 Euclid Avenue • Cleveland 3, Ohio

Plant Equipment Previews

(*Continued from page 190*)

out assistance. A self-energizing motor brake, which does not require adjustment, interlocks with the controller to provide safe operation. Upper and lower safety limit switches are provided. Hoists can be operated even in inverted positions.

MARCH, 1947
PEP 47

PRESSURE SWITCHES

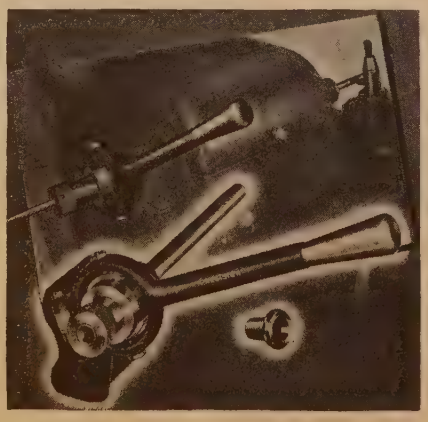
Selection Board's Opinion: Small design.
Manufacturer: The Thermix Corp., Greenwich, Conn.

Features: Versatile switches for control of automatic gas, oil, or coal-fired steam boilers. Can also be used on air and refrigeration compressors and pumps. Are available in pressure ranges from 1 to 300 lbs. and with differentials from 1 to 80 lbs.

MARCH, 1947
PEP 48

LEVER-TYPE DRAWBAR

Selection Board's Opinion: High leverage reduces operator fatigue.



Manufacturer: General Die and Stamping Co., 262-272 Mott St., New York 12, N. Y.
Features: This drawbar, designed for production use on popular half-inch capacity lathes, is desirable for ease of operation and where there is slight variation in work diameter. Has 3 positions of tension adjustment. Positive gripping tension is applied over range of 3 adjustments. Has no chatter, even at high speed. Is ruggedly built for long life.

(*Continued on page 194*)

PUT YOUR FLOORS IN HIS HANDS

BECAUSE HILLYARD FLOOR TREATMENTS AND MAINTENANCE PRODUCTS ARE

★ DEPENDABLE
★ UNIFORM
★ ECONOMICAL
★ SAVE TIME

And properly protect and make attractive all types of floors and give entire satisfaction with less labor.

THIS NEW BOOK **Sent Free** UPON REQUEST

THE HILLYARD COMPANY

DISTRIBUTORS

Hillyard Chemical Co., 370 Turk St., San Francisco, Calif.
St. Joseph, Mo., 1947 Broadway, New York, N. Y.

SIMONDS

Provides these

2 Extra Aids

to make sure all users get Smoother Cutting and Longer Life from all

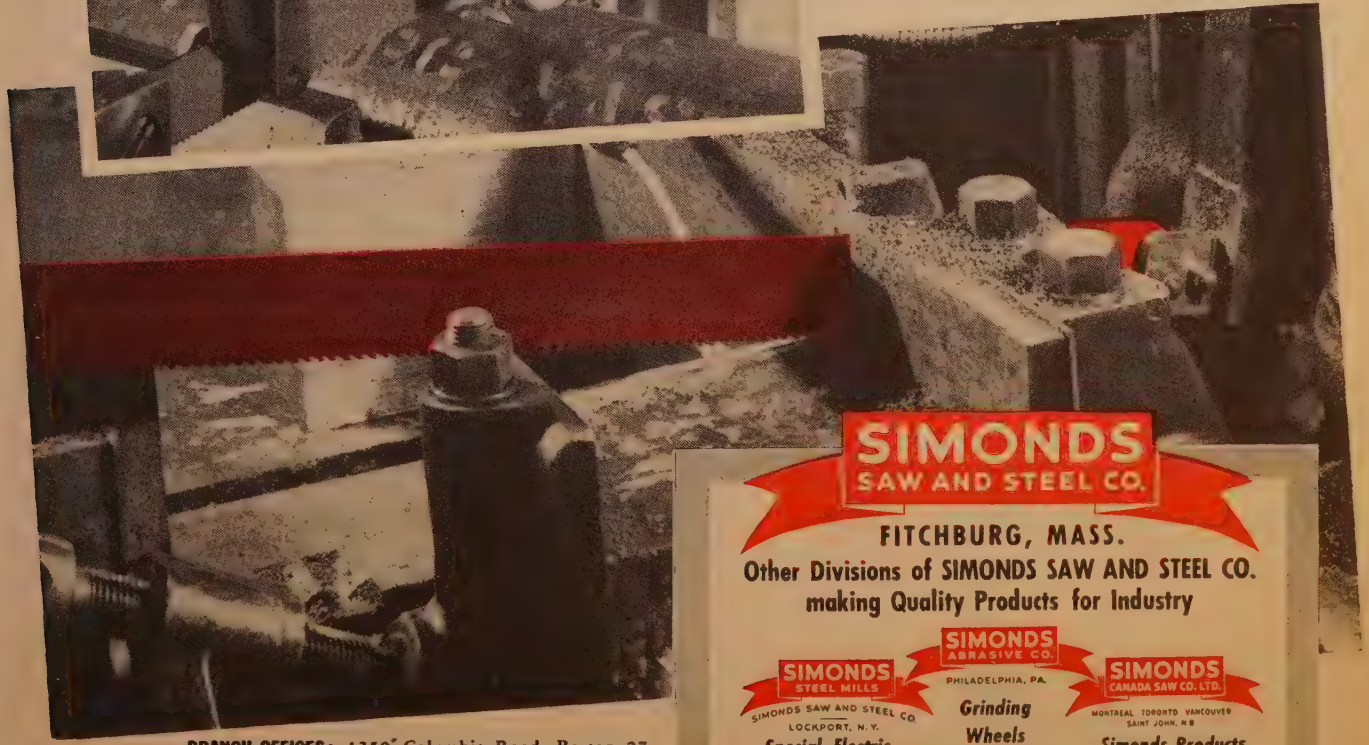
"RED END"

Hacksaw Blades

1. New Educational Motion Picture. Designed to take a new operator through the various steps in the proper use of both hand and power-machine hacksaw blades. It helps him select the right blade for different cutting jobs and the correct methods of operation in order to get greatest efficiency and longest blade life.

This 16 mm. film, with color and sound, will be interesting and helpful to experienced operators also, because it actually shows how hacksaws cut. And it explains the new technique of hacksaw tensioning which has helped many plants to get greater cutting efficiency. Showings may be arranged through the nearest Simonds office.

2. "SIMOMETER" Eliminates Guesswork in Hacksaw Tensioning. This new device saves costs by eliminating guesswork when tensioning blades. Attached directly to any blade, the "SIMOMETER" avoids inaccuracies due to friction of blade holder, or to varying thread pitches of tightening devices. Ask your Industrial Supply Distributor for a demonstration.



SIMONDS SAW AND STEEL CO.

FITCHBURG, MASS.

Other Divisions of SIMONDS SAW AND STEEL CO. making Quality Products for Industry

SIMONDS STEEL MILLS
SIMONDS SAW AND STEEL CO.
LOCKPORT, N. Y.
Special Electric Furnace Steels

SIMONDS ABRASIVE CO.
PHILADELPHIA, PA.
Grinding Wheels and Grains

SIMONDS CANADA SAW CO. LTD.
MONTREAL TORONTO VANCOUVER SAINT JOHN, N.B.
Simonds Products for Canada

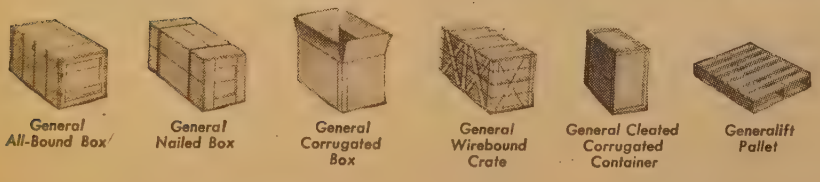
BRANCH OFFICES: 1350 Columbia Road, Boston 27, Mass.; 127 S. Green St., Chicago 7, Ill.; 416 W. Eighth St., Los Angeles 14, Calif.; 228 First St., San Francisco 5, Calif.; 311 S. W. First Avenue, Portland 4, Ore.; 31 W. Trent Ave., Spokane 8, Wash. *Canadian Factory:* 595 St. Remi St., Montreal 30, Que.

Generally Speaking-

"THE CONTAINER IS PART OF THE PRODUCT"

• Our engineers have had many years of experience in the redesign of shipping containers. Result is that General Engineered Containers are compact, light in weight, and extra strong. They are designed specifically to the product. They're actually "a Part of the Product."

Whatever your packaging need may be, you'll find the current issue of "The General Box" packed with practical information. Why not write for it today?



General All-Bound Box | General Nailed Box | General Corrugated Box | General Wirebound Crate | General Cleated Corrugated Container | Generalift Pallet

ENGINEERED SHIPPING CONTAINERS

25 YEARS YOUNG 1922-1947

25 years' experience in designing better containers for all industry.

General BOX COMPANY

GENERAL OFFICES: 506 N. Dearborn St., Chicago 10, Ill.

DISTRICT OFFICES AND PLANTS: Brooklyn, Cincinnati, Detroit, East St. Louis, Kansas City, Louisville, Milwaukee, New Orleans, Sheboygan, Winchendon, Natchez.

Continental Box Company, Inc.: Houston, Dallas.

Plant Equipment Previews

(*Continued from page 192*)

MARCH, 1947
PEP 49

STEAM CLEANING DETERGENT

Selection Board's Opinion: Cleaning equipment remains in constant use.

Manufacturer: The Penetone Co., Tenafly, N. J.

Features: Detergent is liquid compound, water-soluble which does not require premixing. Is poured with water right into steam cleaning equipment tank. Eliminates clogging of cleaning equipment parts. Said to remove stubborn grease, oil and grime accumulations but not affect paint or finishes.

MARCH, 1947
PEP 50

PORTABLE BASE FOR SMALL MACHINE TOOLS

Selection Board's Opinion: Most versatile tool.

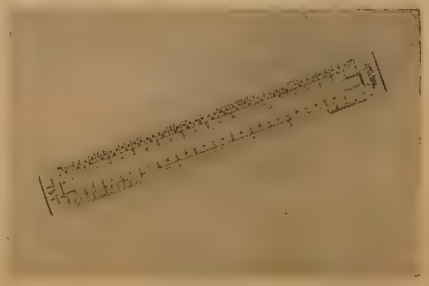
Manufacturer: Race Inc., 3010 Hiawatha Drive, Dayton 5, Ohio.

Features: Any small machine tool may be easily clamped or bolted to the bed of this portable base enabling a tool commonly used by more than one operator to be moved from one production machine to another quickly, thus multiplying without extra cost the usefulness of that particular tool.

MARCH, 1947
PEP 51

DRAFTING SCALE

Selection Board's Opinion: A useful time saver.



Manufacturer: Stewart-Jackson Instrument Co., 215 W. 7th St., Los Angeles 14, Cal.

Features: Eight different scales are incor-

(*Continued on page 196*)

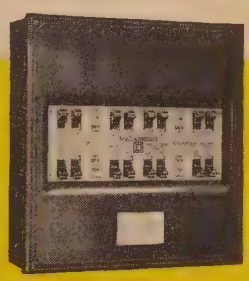
Wherever you need . . .
OVERCURRENT PROTECTION

You save time and money with Square D Circuit Breakers

Weatherproof, Dust-Tight and Explosion-Resisting Circuit Breakers.

MO Multi-breaker for use on small machines.

Industrial Circuit Breakers in standard sheet steel enclosures.



Multi-breaker Load Centers for controlling and protecting lighting and small power circuits.

Rain-tight Multi-breakers with a variety of circuit arrangements.

Industrial Multi-breakers in capacities from 15 to 100 amperes, with 2 or 3 poles.

Multi-breaker Load Centers in Cast Iron Enclosures for Class 1, Group D and lower applications.

Multi-breaker Type M Load Centers with 50 ampere frame breakers for applications involving 120-240 volt AC circuits.

HERE'S HOW YOU SAVE TIME . . .

1 *Harmless momentary overloads pass without breaking the circuit, due to a time-lag feature built into every Square D Circuit Breaker.*

2 *Restoration of service is quick and easy. No replacing of fuses. A simple movement of the operating lever restores current after the cause of the short or overload has been eliminated.*

HERE'S HOW YOU SAVE MONEY . . .

1 *Fuses are eliminated—no replacement of parts is necessary.*

2 *Electrical equipment has constant proper protection, because every Square D Circuit Breaker unit is factory-sealed and consequently tamper-proof.*

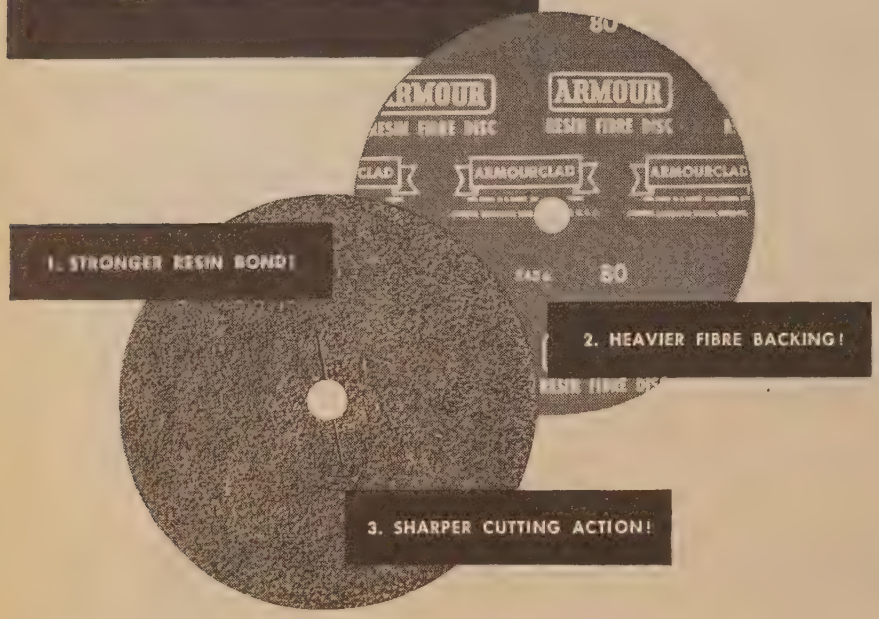
Square D makes exactly the Breaker you need

● Square D's *complete* line enables you to select exactly the right device for any given installation. A wide variety of enclosures, including general-purpose, raintight, dust-resisting, and explosion-resisting. Capacities range from 15 to 600 amperes, up to 600 volts. Send for INDUSTRIAL CIRCUIT BREAKER BULLETIN which illustrates and describes the complete line.

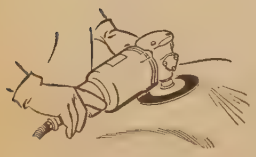
SQUARE D COMPANY

DETROIT • MILWAUKEE • LOS ANGELES

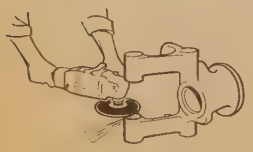
3 Major Improvements



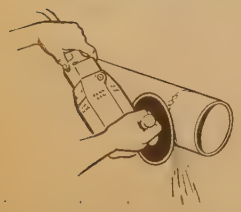
Now... Faster, more productive metalworking with the New ARMOURCLAD RESIN FIBRE DISC!



Actual production tests have proved that this new disc *cuts faster*. This greater initial rate of cut lowers production costs, reduces labor costs.



The new Armourclad Resin Fibre Disc cuts *faster longer* because its special resin bond gives better grain adhesion—greater resistance to heat and humidity.



Better for all disc operations, the new Armourclad Resin Fibre Disc is *especially good* for severe grinding jobs.

ARMOURCLAD TRADE MARK Reg. U. S. Pat. Off.

Look for This Label on the Green-Backed Disc

ARMOUR *Sandpaper* WORKS

Division of Armour and Company

1355 West 31st Street • Chicago 9, Illinois

Export: Durex, 63 Wall Street, New York 5, N. Y.

Plant Equipment Previews

(*Continued from page 194*)

porated on one side of this transparent plastic instrument. The scale need not be turned over to find calibrations of 1/8", 1/4", 3/8", 1/2", 3/4", 1", 1 1/2" and 3" per foot. Overall length is 13 1/2" with scales reading to 12".

MARCH, 1947
PEP 52

HEAVY DUTY HAND TRUCK

Selection Board's Opinion: Lightweight.

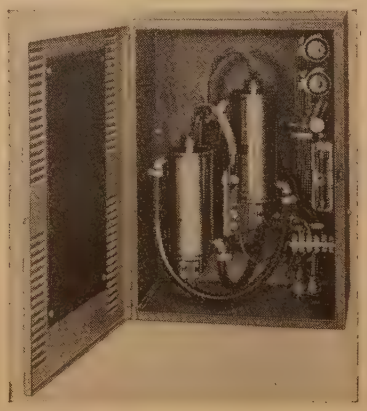
Manufacturer: Thermoid Co., 305 Whitehead Road, Trenton 6, N. J.

Features: Truck is 53" high x 18" wide with 9" wheels. Its lightweight character comes from being made of rugged aluminum castings but with a steel nose. The wheels have solid cut-resistant tires and incorporate heavy duty ball bearings with a built-in grease seal that prevents the entry of dust or dirt to the bearings.

MARCH, 1947
PEP 53

ELECTRONIC CONTACTORS FOR RESISTANCE WELDERS

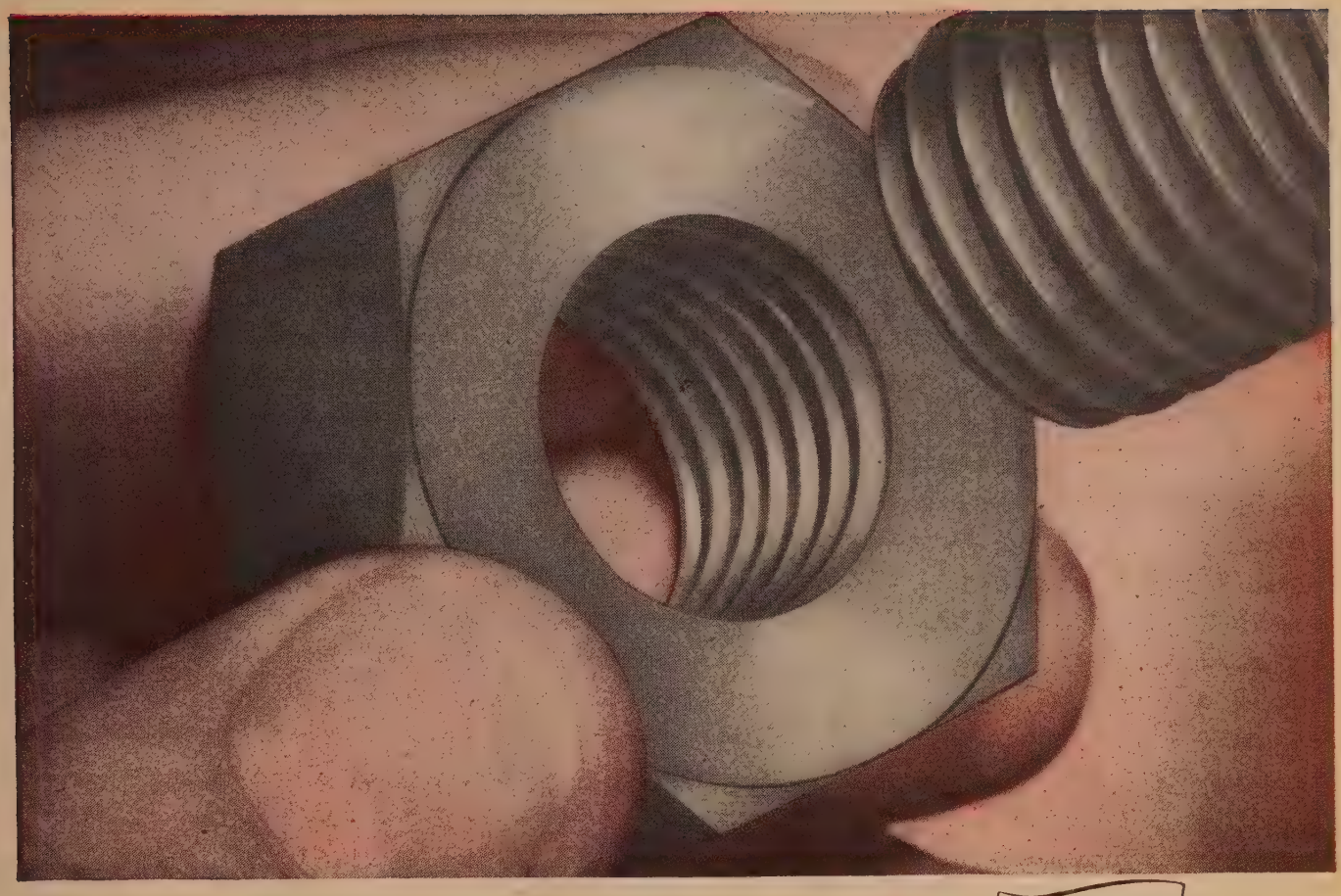
Selection Board's Opinion: Well protected and easy to maintain.



Manufacturer: Square D Company, 6060 Rivard, Detroit, Mich.

Features: Useful for resistance welding jobs involving high speed operation or heavy primary currents of short duration. They have increased wiring space with power connections made near the center of the

(*Continued on page 198*)



WHEN YOU LOWER THE COST OF USING FASTENERS . . . THAT'S **t.f.e.** *True Fastener Economy!*

Since the time and labor costs of assembling a nut on a bolt usually exceed the cost of the fasteners, it's *T*rue *F*astener *E*conomy to buy the brand that gives maximum speed and convenience in assembly.

RB & W Nuts Save Assembly Time

The care which RB & W takes to produce nuts with utmost accuracy and uniformity . . . pays off in terms of lower assembly cost. Careful selection of material; cold-punching that insures toughness, freedom from splitting, uniformity of size; repunching that guarantees concentricity of hole; burnishing that assures smoothness of all surfaces; tapping on machines of special design that provide accurate, clean threads . . . result in nuts that run on quickly and take severe wrenching in their stride.

You Get T. F. E. When You

1. Reduce assembly time to a minimum by savings through use of accurate and uniform fasteners
2. Make your men happier by giving them fasteners that make their work easier
3. Reduce need for thorough plant inspection, due to confidence in supplier's quality control
4. Reduce the number and size of fasteners by proper design
5. Purchase maximum holding power per dollar of initial cost, by specifying correct type and size of fasteners
6. Simplify inventories by standardizing on fewer types and sizes of fasteners
7. Save purchasing time by buying larger quantities from one supplier's complete line
8. Contribute to sales value of final product by using fasteners with a reputation for dependability and finish

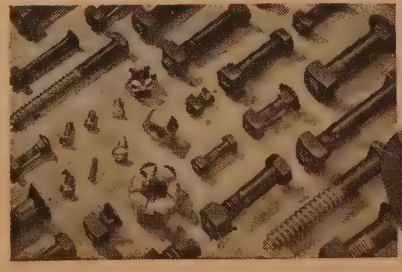
RUSSELL, BURDSALL & WARD BOLT AND NUT COMPANY

102 years making strong the things that make America strong

RB&W bolts, nuts, screws, rivets and allied fastening products are manufactured in a broad range of styles, sizes and finishes.

• • •

Plants at: Port Chester, N. Y., Coraopolis, Pa., Rock Falls, Ill., Los Angeles, Calif. Additional sales offices at: Philadelphia, Detroit, Chicago, Chattanooga, Portland, Seattle. Distributors from coast to coast. By ordering through your distributor, you can get prompt service from his stocks for your normal needs. Also—the industry's most complete, easiest-to-use catalog.



EFFICIENCY IS *Essential!*

Efficiency is essential to production. "THE CINCINNATI" stands for electrical tools with "Engineered Efficiency" . . . economical electrical tools for profitable production.

GRINDERS — ⅓ TO 15 H. P.

ELECTRIC DRILLS ¼" TO 1¼"

CALL YOUR NEAREST DISTRIBUTOR

BUFFERS — ½ TO 15 H. P.

PORTABLE GRINDERS — 5", 6", and 8" Wheel Capacities.

MANUFACTURERS OF

Electric Drills
Screw Drivers
Nut Setters
Tappers
Routers
Portable Grinders
Tool Post Grinders
Speed Lathes
Bench and Pedestal Grinders
Bench and Pedestal Buffers
Abrasive Cut-Off Machines
Air Master Dust Collectors

TOOL POST GRINDERS — ¼ to 1 H.P.

TRADE The Cincinnati MARK

THE CINCINNATI ELECTRICAL TOOL CO.

Division of THE R. K. LeBLOND MACHINE TOOL CO.

2696 MADISON ROAD, CINCINNATI 8, OHIO

Plant Equipment Previews

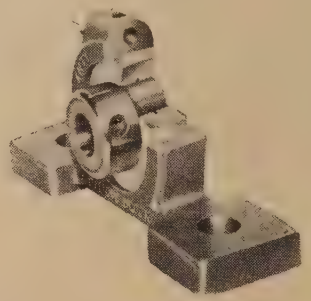
(*Continued from page 196*)

enclosure allowing minimum bending of power cables. Contactor is assembled on a removable steel base plate. Control elements are out of path of any dripping from water condensation on tubes and hoses.

MARCH, 1947
PEP 54

SELF-ALIGNING BRONZE PILLOW BLOCK AND FLANGE UNIT

Selection Board's Opinion: Self-aligning feature a recommendation.



Manufacturer: Anti-Friction Bearings Co., 2020 S. Figueroa St., Los Angeles 7, Cal.

Features: Split high tensile strength aluminum housing carries spherical naval bronze bearing. Ground adapter sleeve is inserted in bronze bearing so one basic pillow can serve a number of shaft diameters. Line includes sizes from ⅝" to 3" shaft diameters in both pillow blocks and flange units.

MARCH, 1947
PEP 55

PHOTOELECTRIC COUNTER

Selection Board's Opinion: Accurate.

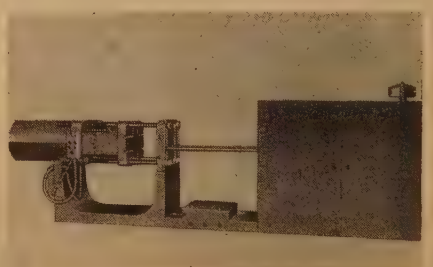
Manufacturer: Photoswitch Inc., 77 Broadway, Cambridge 42, Mass.

Features: Consists of a photoelectric control, light source, and electric counter. The only equipment needing to be located at point-of-count is the control and the light source. Maximum number of counts before returning to zero: 99,999. It is reset to zero simply by turning reset knob.

MARCH, 1947
PEP 56

DIE CASTING MACHINE

Selection Board's Opinion: Fast production.



Manufacturer: H. L. Harvill Mfg. Co., Corona, Cal.

Features: A high speed cold chamber injection type for casting aluminum, magnesium and brass alloys. Provision is made

(*Continued on page 200*)

For paint spray booths

Westinghouse Type FDT-40 Fluorescent dust-tight and vapor-tight luminaire. Approved for Class II, Group G, hazardous locations.

..... *where safe, easy-to-maintain lighting is a must*

Spray booth lighting presents three special problems—all of which must be considered in selecting the *right* lighting unit.

First: the seeing task is often difficult because of poor contrast conditions between the color of paint and the surface on which it is applied. *Second:* most paint materials used contain inflammable solvents, the fumes from which constitute a definite fire hazard. *Third:* the fine paint spray or "dust" collects on exposed lighting equipment, so maintenance is a real problem.

The Type FDT-40 fluorescent luminaire meets these conditions by providing high illumination without glare—by dust-tight and vapor-tight construction, and by ease of maintenance. Paint residue or dust is easily removed from the glass cover.

For application and installation information, ask your nearest Westinghouse distributor for Data Sheet 3312-A. Or write Westinghouse Electric Corporation, P.O. Box 868, Pittsburgh 30, Pennsylvania. J-04109

Westinghouse

PLANTS IN 25 CITIES . . . OFFICES EVERYWHERE

PLANNED LIGHTING

AVAILABLE THROUGH 127 WESTINGHOUSE ELECTRIC SUPPLY OFFICES AND INDEPENDENT JOBBERS

"Portables are good fire protection here—and good business *too!"*

Is your plant garage safe from fires . . . that might keep your trucks off the road when you need them most?

Let a Kidde representative show you how effectively you can control garage fires with a *Kidde* Portable Extinguisher or two. The dry, clean carbon dioxide from a *Kidde* Portable quickly smothers the blazes that can so easily start in gasoline and oil—or in the electrical wiring of a truck. And the carbon dioxide causes no corrosion or other damage—leaves no mess behind.

A Kidde representative will be glad to discuss other special fire hazards you may have. His fire protection knowledge may be useful to you in many ways—feel free to avail yourself of it.

Walter Kidde & Company, Inc., 340 Main St., Belleville 9, New Jersey

The word "Kidde" and the Kidde seal are trade-marks of Walter Kidde & Company, Inc.

Kidde

FIRE PROTECTION HEADQUARTERS

Plant Equipment Previews

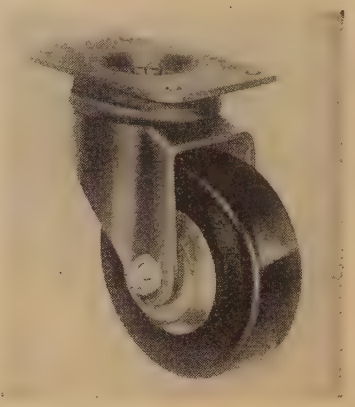
(*Continued from page 198*)

for conversion to hot chamber operation for casting zinc, lead and tin base alloys. Machine is capable of casting up to 2.6 lbs. of aluminum at a maximum reduction rate of 500 "shots" per hour.

MARCH, 1947
PEP 57

STEEL CASTER

Selection Board's Opinion: Well designed for light duty uses.



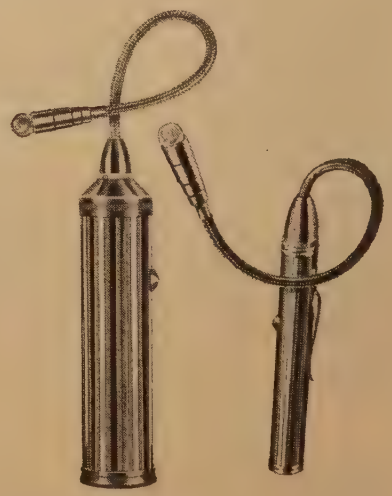
Manufacturer: Rapids Standard Co. Inc., Grand Rapids, Mich.

Features: Incorporates unusual liveliness in action, and recommended for all types of light trucks, dollies, etc. The top plate of 1/8" steel is 2 1/2" x 3 5/8" with bolt holes for 1/4" bolts at 1 3/4" x 2 7/8" center to center spacing. Overall height is 4-11/16".

MARCH, 1947
PEP 58

FLEXIBLE FLASH LIGHT

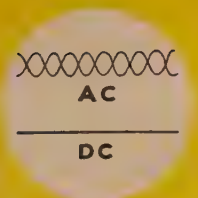
Selection Board's Opinion: Useful for getting into small areas.



Manufacturer: Holub Industries Inc., Sycamore, Ill.

Features: Spots the light where wanted. The flexible metal tubing holds in position when it is wound around rods, pipes, etc., or when laid on a ledge gives a spot light where wanted, freeing both hands.

(*Continued on page 204*)



AC OR DC — Yes, whatever your machines, AC or DC, whatever your work, "SM" performs perfectly. It's the true production electrode for welding thin gauge metals.

LOWER PENETRATION — You get less penetration—the *desired* amount of penetration with "SM." Gone are your troubles of "burn-throughs" and "suck-ins." Use "SM" on metals down to 20 gauge.

"DROP OFF" SLAG — A really unusual and important feature of "SM" — main reason why one of America's largest light gauge fabricators uses it exclusively. Slag removal is no problem with its "drop off" characteristic.

"SM" gives you—

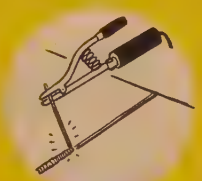
ALL-POSITION — Whatever you're fabricating — auto or truck bodies, tanks, furniture, window frames, etc., you can weld them in any position. All-position welding rounds out "SM's" versatility — makes it an electrode you can't afford *not* to use.

CONVINCE YOURSELF—TRY "SM"

SPRAY TYPE ARC—Specially developed coating gives "SM" *ideal* concentrated spraying action for faster, smoother, stronger welds on all positions.

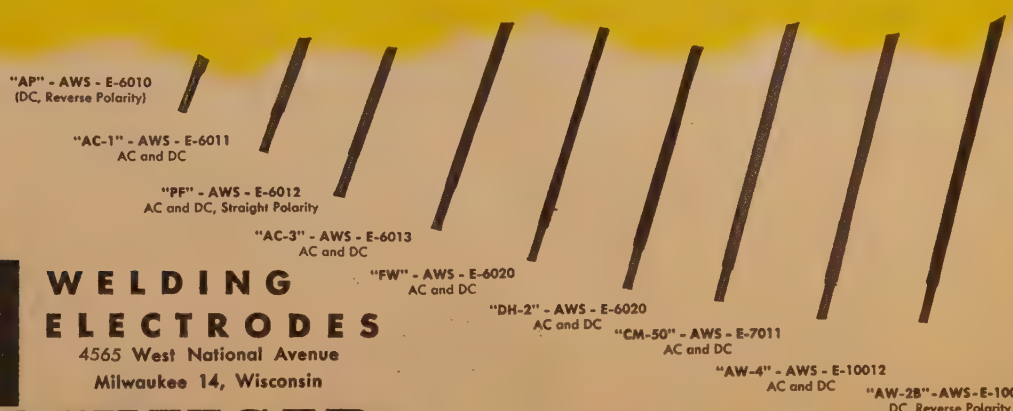
OTHER POPULAR P&H MILD STEEL ELECTRODES

There's a production approved electrode for every requirement in the complete P&H line. Below are just a few. Get complete information from your P&H representative or write us.



REDUCED SPATTER LOSS—The extremely small amount of spatter greatly increases welding efficiencies of "SM."

FLAT, THIN BEAD — Another important advantage: Its very smooth, flat bead. Say goodbye to "humped" or convex bead that requires expensive grinding, careful finishing.


"AP" - AWS - E-6010
(DC, Reverse Polarity)
"AC-1" - AWS - E-6011
AC and DC
"PF" - AWS - E-6012
AC and DC, Straight Polarity
"AC-3" - AWS - E-6013
AC and DC
"FW" - AWS - E-6020
AC and DC
"DH-2" - AWS - E-6020
AC and DC
"CM-50" - AWS - E-7011
AC and DC
"AW-4" - AWS - E-10012
AC and DC
"AW-2B" - AWS - E-10020
DC, Reverse Polarity

P&H

WELDING ELECTRODES

4565 West National Avenue
Milwaukee 14, Wisconsin

HARNISCHFEGER CORPORATION

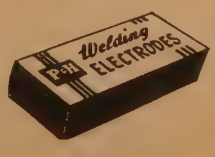
WELDING ELECTRODES • MOTORS • HOISTS P&H ELECTRIC CRANES • ARC WELDERS • EXCAVATORS

Also a complete line of P&H Electrodes for stainless and alloy steels, as well as for hard surfacing.

AMERICA'S MOST COMPLETE ARC WELDING SERVICE.

DC Welders

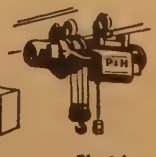
AC Welders



Welding Electrodes

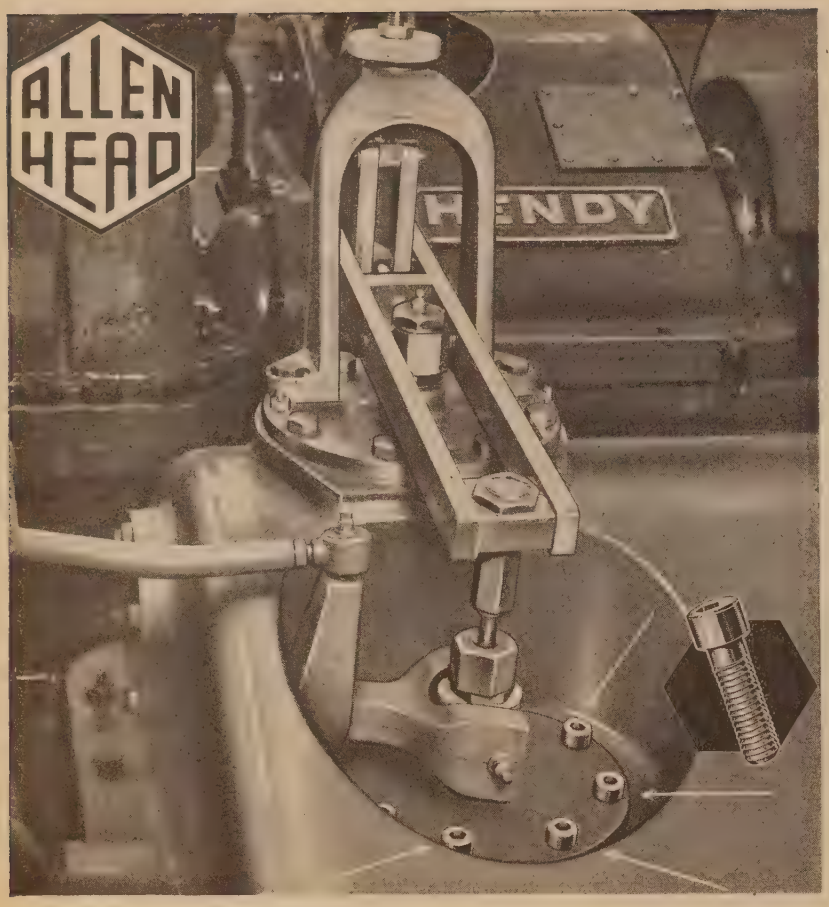
Welding Positioners

Welding Production Control Systems



Electric Hoists

Electric Cranes



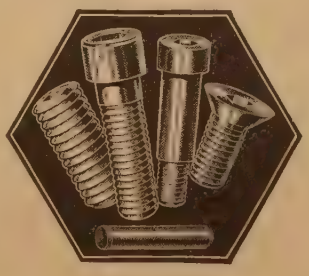
ALLEN SOCKET HEAD CAP SCREWS

— as used in the governor assembly of turbo-generator set, 500-kw. unit built by Joshua HENDY Iron Works, Sunnyvale, Calif.

In the governor mechanism, in a special sense, the *controlling* factor is integrity of the assembly and DEPENDABILITY of its components. In this place of responsibility are ALLEN Socket Head Cap Screws, — and in *other* important places in the power unit.

"Allens" have the HOLDING-POWER because they have the strength for powerful set-ups. Their strength is gained by *"pressur-forming"* of special-analysis *ALLENOY* steel, which makes the steel fibres conform to the shape of the screw head. In the perfectly-formed hex sockets, the keys bear evenly and equally on all surfaces. Threads also are *"pressur-formd"* to a high Class 3 fit, for high-friction hold in tapped hole.

Order of your local Industrial Distributor.



THE ALLEN MANUFACTURING COMPANY
HARTFORD 1, ★ ALLEN ★ CONNECTICUT, U. S. A.

Plant Equipment Previews

(*Continued from page 200*)

MARCH, 1947
PEP 59

DEMAGNETIZER

Selection Board's Opinion: Useful for toolrooms, etc.

Manufacturer: Luma Electric Equipment Co., Toledo 1, Ohio.

Features: Especially useful on drills, punches, reamers, etc., that have been in contact with a magnetic chuck or have become magnetized through processing. One quick pass over the flat top grid completely demagnetizes small pieces. Furnished in 3 standard top plate sizes: 4½" x 7¼"; 7¼" x 7½" and 7½" x 14".

MARCH, 1947
PEP 60

SOOT REMOVER

Selection Board's Opinion: Efficient means of removing soot.

Manufacturer: O'Brien Industries, Bala Cynwyd, Pa.

Features: Effectively cleans oil or coal-fired marine and industrial boilers. Its chemical qualities lower the ignition point of both caked and loose soot to permit burning besides supplying ample oxygen to support combustion. A convenient feeder is supplied with an order of 1000 lbs. or more.

MARCH, 1947
PEP 61

SKID PLATFORM

Selection Board's Opinion: Sturdy construction.

Manufacturer: Phillips Mine and Mill Supply Co., 2227 Jane St., Pittsburgh, Pa.

Features: Made to withstand the severest usage in handling heavy castings, scrap and

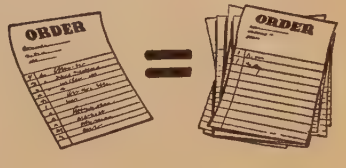
(*Continued on page 206*)

For that plant addition you're planning...

GraybaR can help you get the best combination

It's a good idea to have Graybar work with you in planning *any* wiring job. Graybar knows wiring — all kinds — and distributes carefully selected makes of wire, cable . . . busduct, conduit, raceways . . . fittings for all wiring systems . . . connectors, wiring devices, panels, fuses . . . primary equipment . . . specialized tools. The near-by Graybar Inside Construction Specialist can help you or your electrical contractor choose the best combination of conductors and supplies for any installation.

Our national warehousing system can simplify your job of getting "everything electrical". Although it's impossible for us to maintain complete stocks today, many items are available for immediate delivery. Call our nearest office. *Graybar Electric Company. Executive offices: Graybar Building, N. Y. 17, N. Y.*



How Graybar simplifies your electrical buying

Graybar makes it possible for you to obtain — from a single convenient source — more than 60,000 electrical items, made by over 200 leading manufacturers. Through its 95 offices and warehouses, Graybar shortens the economic distances between 200 makers and 35,000 users. One order, one responsibility, one invoice does the work of many.

4733

Via GraybaR
... convenient source of 60,000 electrical items

IN OVER 90 PRINCIPAL CITIES

WIRING • LAMPS and LIGHTING • COMMUNICATION • SIGNALING • VENTILATION • CONTROL • POWER APPARATUS • TOOLS

"Effortless Lifting!"

Lifting by hand when electricity is available is a continuous loss if the lifting is part of the day's work.

With fast effortless lifting, men produce more at less cost if all their strength and energy is devoted to production and not wasted by lifting. Fears of rupture and sprains vanish.

The 'Budgit' Electric Hoist pioneered in popularizing effortless lifting. Many thousands of men are grateful for 'Budgit' Hoists which made their jobs so much easier. Thousands of employers enjoy the additional profit made by using 'Budgit' Hoists.

There are no installation costs. The current consumption is trifling. And countless experiences prove they pay for themselves many times over in their long lives.

Made in sizes to lift 250, 500, 1000, 2000 and 4000 lbs. Prices start at $119. Write for Bulletin No. 371.

MAXWELL MANNING MM&M MOORE INC. TRADE MARK

'BUDGIT' *Hoists*

MANNING, MAXWELL & MOORE, INC.
MUSKEGON, MICHIGAN

Builders of 'Shaw-Box' Cranes, 'Budgit' and 'Load Lifter' Hoists and other lifting specialties Makers of Ashcroft Gauges, Hancock Valves, Consolidated Safety and Relief Valves and 'American' industrial instruments.

Plant Equipment Previews

(Continued from page 204)

all types of industrial products, the skid platform is of all-welded steel with heavy corrugated steel deck. No bolts or screws are used which could tear or score the load. Broad bearing 3" channel legs of 3/16" plate prevent load tipping.

MARCH, 1947
PEP 62

AIR FILTER

Selection Board's Opinion: Should eliminate clogging problem.

Manufacturer: Moore Products Co., H and Lycoming Streets, Philadelphia 24, Pa.

Features: Designed to remove oil fog from instrument supply air. The pressure drop, with a supply pressure of 75 p.s.i. and a flow of 0.5 s.c.f.m., is approximately 1/8 p.s.i. A continual cleaning of the filtering material results from the steady "blow down" action of the air. The unit is of brass and bronze construction, 2 1/8" in diam. x 9" long.

MARCH, 1947
PEP 63

PORTABLE SAW RIGS

Selection Board's Opinion: Tilt top feature good.

Manufacturer: The Paxson Co., Dowagiac, Mich.

Features: Built in 4 models. Models XCO (tilting top) and CO (fixed top) rip or cut-off stock up to 9" thick with saw diameter up to 24"; models XJR (tilting top) and JR (fixed top) rip or cut-off stock up to 4" thick. All 4 models offer welded wheel angle frame and top construction, with channel steel skids, combining portability from job to job with maximum strength and rigidity.

(Continued on page 208)

"Before we put that up they tossed waste all over—"

WHEN HE COOLS OFF THE BASA GENIE WILL TELL HIM ABOUT BASA

T-147

You can understand why the irate gentleman above *is irate*—if you've ever had to do a job with a mushroomed rawhide hammer. Greene, Tweed, one time manufacturer of one of the finest rawhide hammers obtainable, recognized this shortcoming even in the finest and undertook the task of developing a superior material—that would be safer, more durable and retain its efficiency throughout its longer life. After extensive research, resilient BASA, the all-purpose striking face, was born. It lasts twice as long as rawhide . . . doesn't mark . . . wears down evenly . . . is quickly replaced in your BASA replaceable face hammer. For complete descriptive literature and location of nearest distributor, write Department B, GREENE, TWEED & CO. —North Wales, Pa.

PALMETTO 2200

A High Pressure Spiral

THAT'S NOT ALLERGIC TO LUBRICATING OILS

Many high pressure packings are tough enough to withstand gruelling punishment from heat and pressure but when lubricating oils begin their deteriorating attack, *ordinary* High Pressure Spiral packing quickly disintegrates causing possible equipment damage, loss of time and loss of money.

Palmetto 2200 gives you *complete protection* while it stands up and serves throughout its long life. This *oil proof* High Pressure Spiral because of a special binder, years of "know how" and the finest materials available will resist *all* the harmful effects of oil, heat and water.

All Palmetto Packings enjoy an enviable reputation . . . Write for descriptive literature.

GREENE, TWEED & CO. — NORTH WALES, PA.

PALMETTO Packings

In the United States and Canada There is a Distributor Near You

T-147

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☐ Send literature please ☐ Send a representative please

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FIRM_____

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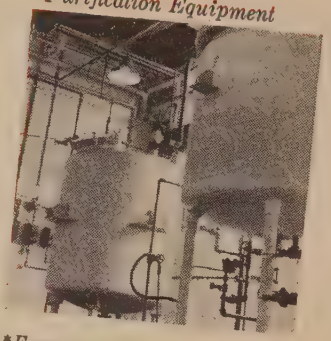
CONTROLLING CORROSION IN STREPTOMYCIN PRODUCTION . . .

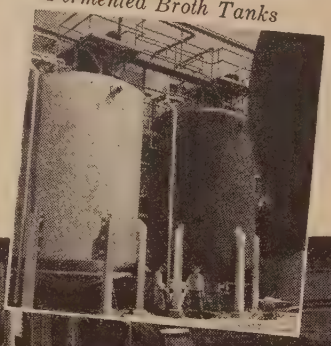
When the engineers for a leading pharmaceutical company designed the first large scale streptomycin plant, they knew they faced critical corrosion and contamination problems. For equipment, they used rubber lined tanks and porcelain pipes, with pumps and filters of special alloys. *To stop corrosion from spills, drips and fumes, they used Prufcoat Protective Coatings.*

This is one more example of the way Prufcoat teams up with the other good materials available to the chemical process engineer interested in controlling corrosion and contamination.

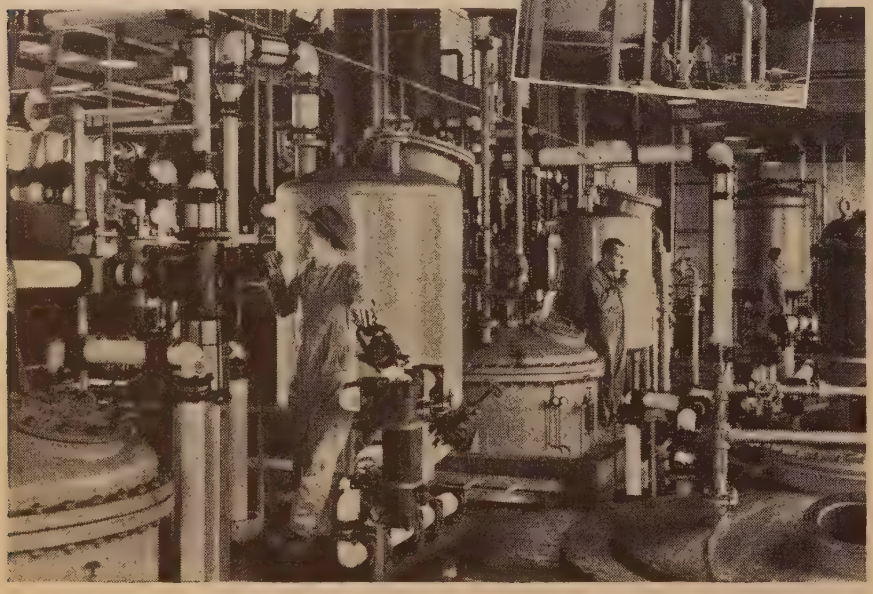
**Purification Equipment*



**Fermented Broth Tanks*



**Extraction Units*



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Prufcoat is a special formulation of synthetic resins that air-dries by evaporation of the volatile solvents. One material for application to all surfaces — concrete floors, walls, ceilings, structural steel, tanks, pipes, ducts, machinery and equipment. Available in a variety of standard colors for identification of lines or equipment, Prufcoat costs only slightly more per gallon than ordinary paint, costs no more to apply, and has been performance-proved in America's leading chemical process industries, including Hanford and Oak Ridge.

The Prufcoat film formed after polymerization has virtually a zero acid number, saponification number and water absorption rate.

Write today for descriptive bulletin. Prufcoat Laboratories, Inc., 63 Main Street, Cambridge, Massachusetts. Sales Office: 50 East 42nd Street, New York City.

SPECIFICATIONS

- ✓ Acid-Proof
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Applies like paint to masonry, metal, wood

PRUFCOAT
PROTECTIVE COATING

**Photographs courtesy Merck & Co., Inc. Elkton, Va.*

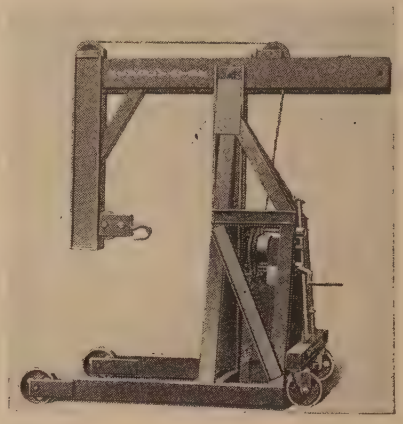
Plant Equipment Previews

(*Continued from page 206*)

MARCH, 1947
PEP 64

FOLDING PORTABLE CRANE

Selection Board's Opinion: Portable and versatile.



Manufacturer: Revolvator Co., 86th St. at Bergen Turnpike, North Bergen, N. J.

Features: Crane is designed so the upper part may be folded down to permit it to move under low doorways or other overhead obstructions. Maximum capacity is 4000 lbs. The crane is equipped with floor lock, and steering handle geared to front wheels which turn easily on Timken roller bearings.

MARCH, 1947
PEP 65

CARBON MONOXIDE ALARM

Selection Board's Opinion: Good protective device.

Manufacturer: Mine Safety Appliance Co., Pittsburgh 8, Pa.

Features: Gives both visible and audible warning when carbon monoxide concentrations in the air reach a pre-determined level. Settings can be set for concentrations as low as .02%. A continuous sample of the air is forced over a catalyst which oxidizes the carbon monoxide. The heat of reaction is measured by thermocouples and indicated on a contacting meter dial. When this reaches the predetermined setting the alarm is sounded and a red light shows.

(*Continued on page 210*)

Sheave to Transmit 1400 Horsepower...

...or a Belt for a 1/4 hp Compressor!

CALL ON THE TEXROPE LINE for the *best* in V-belt engineering and V-belt equipment. That has been true for 22 years — ever since Allis-Chalmers originated the Multiple V-belt drive for industry.

Back of every *Texrope* installation — from fractional horse power V-belts that manufacturers put on washers, air-compressors or water systems—to the biggest V-belt drives ever designed and successfully applied—stands the finest V-belt engineering talent in the world.

There's no substitute for this vast experience and tremendous fund of knowledge. It is reflected in every *Texrope* product.

What do *you* need . . . a few V-belts and sheaves — or a daring new application of the multiple V-belt principle? Call on the *Texrope* line! Equipment and engineering help are as close as your nearest A-C sales office or dealer. ALLIS-CHALMERS, MILWAUKEE.

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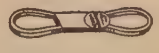
TEXROPE ..Greatest Name in V-Belt Drives



"Super 7" V-BELTS
Five Types — Sizes to suit every power transmission job.

Texsteel, Texdrive, "Magic-Grip"
— sheaves in a full range of sizes, grooves.

"Vari-Pitch" SHEAVES
Exact variations in speed, stationery or motion control.

SPEED CHANGERS
Speed variations up to 375% at the turn of a crank.

ENGINEERING
Finest V-Belt engineering talent in the world—at your call.

TEXROPE "Super 7" V-Belts result from the cooperative research of two great companies — Allis-Chalmers and B. F. Goodrich. They are sold only by A-C.

ALLIS-CHALMERS

One of the Big 3 in Electric Power Equipment — Biggest of All in Range of Industrial Products

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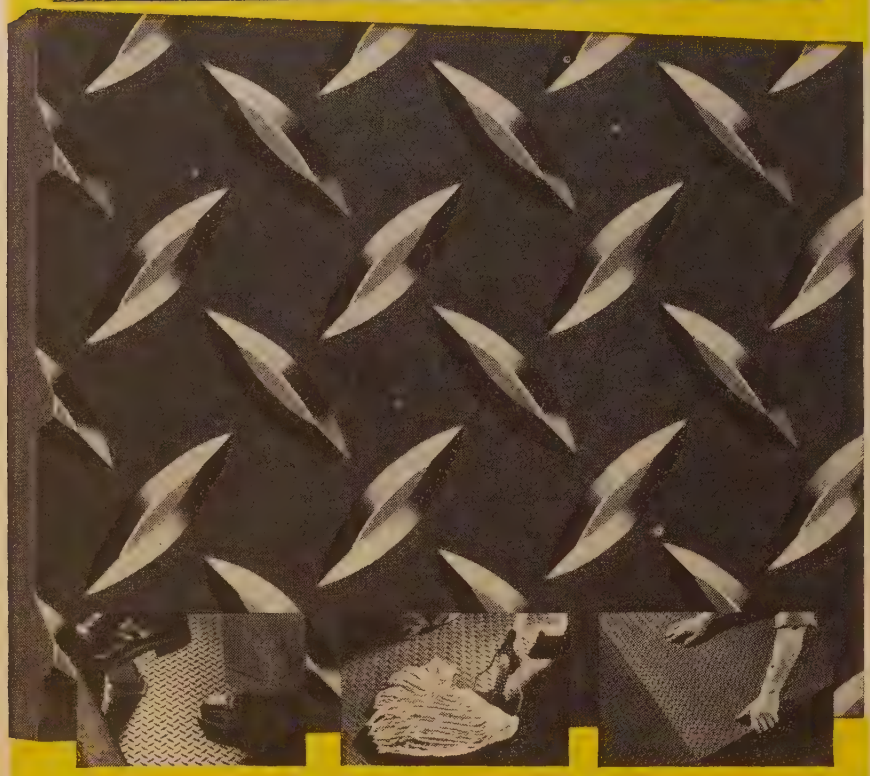
EXCLUSIVE

THERE'S ONLY ONE STATUE OF LIBERTY...AND ONLY ONE

AW SUPER-DIAMOND FLOOR PLATE



GRIP WITHOUT A SLIP! EASY TO CLEAN! EASY TO MATCH!

There are many floor plate patterns but only One AW Super-Diamond Pattern. It's the exclusive super-safe pattern created especially to give you safer, stronger and longer lasting loading platforms, stair-treads, floors, walkways and hatch covers. It grips without a slip. Is easy to clean and easy to match. End your floor maintenance worries by installing AW Super-Diamond Floor Plate now.

FREE A New 16-Page Booklet, L-31. It's chock-full of helpful information: weight, sizes, etc. Write for your copy now. Alan Wood Steel Co., Conshohocken, Penna.

AW SUPER-DIAMOND

FLOOR PLATES THAT GRIP

A Product of ALAN WOOD STEEL COMPANY

Other Products: Billets • Plates • Sheets • Carbon & Alloy

Plant Equipment Previews

(*Continued from page 208*)

MARCH, 1947
PEP 66

WIRE STRIPPER

Selection Board's Opinion: Quickly strips insulation from wires.

Manufacturer: Ideal Industries Inc., Sycamore, Ill.

Features: Through the use of 2 electrically heated stripping blades, the unit quickly strips cotton, silk, plastic insulation or rubber covering from fine stranded or solid conductors. The blades may be set at exact wire diameters and an easily adjustable stop controls the length of stripping. 115 volt, 50/60 cycle are standard, though others are available.

MARCH, 1947
PEP 67

HOLE LOCATOR

Selection Board's Opinion: Easy to adjust and use.

Manufacturer: Knu-Vise Inc., Detroit, Mich.

Features: Enables several sheets of metal to be quickly aligned for riveting, spot welding or drilling. It has a toggle-action which automatically locks upon the work held, leaving operator's hand free for other work. An easy motion separates the handle to release the pliers. The pressure handle is adjustable to admit work up to 1¼" thick.

MARCH, 1947
PEP 68

WELDING ACCESSORY

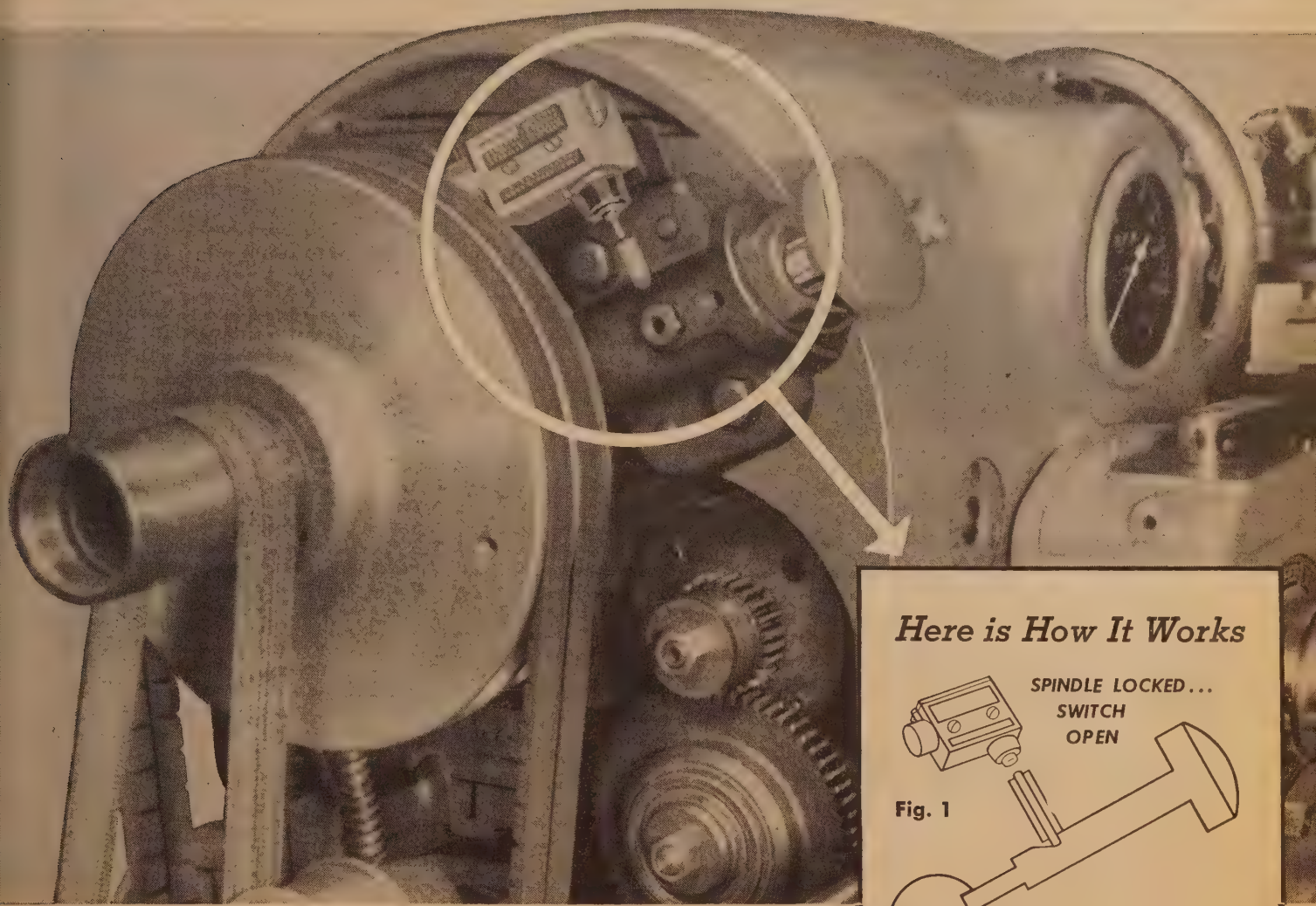
Selection Board's Opinion: Has versatility.

Manufacturer: Cesco Products, Inc., 30 N. LaSalle St., Chicago 2, Ill.

Features: The unit fits over the end of any standard welding torch tip and, using

(*Continued on page 212*)

MICRO Precision Switch Saves Time and Repairs on this Lathe



● A MICRO Precision Switch, with its positive and dependable action, makes it impossible to start the motor on this Lathe unless the spindle lock is released. This switch was installed in the power circuit to prevent damage to the drive mechanism should the operator fail to unlock the spindle before starting the motor.

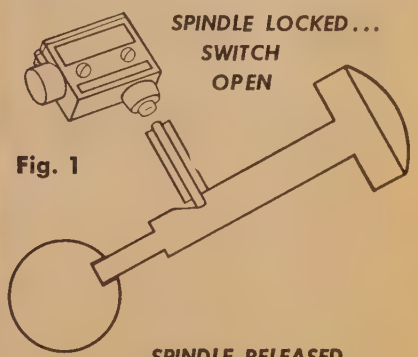
Illustration of Lathe with cover removed shows how factory engineers installed the MICRO Precision Switch in the motor circuit and solved the problem. Further details on how the switch works are shown at the right.

This use of MICRO Precision Switches is typical of hundreds of uses that can be made of these small, sensitive switches to save production time and costs. They are provided with sturdy die cast and steel housings and with seals making them resistant to dust and moisture. Sales engineers are located in MICRO Switch branches to help you with your switching problems. Write nearest branch or MICRO Switch, Freeport, Illinois.

Here is How It Works

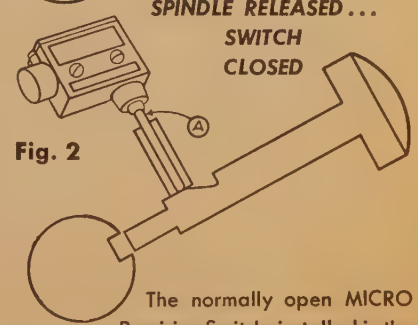
SPINDLE LOCKED... SWITCH OPEN

Fig. 1



SPINDLE RELEASED... SWITCH CLOSED

Fig. 2



The normally open MICRO Precision Switch, installed in the power circuit, leaves the circuit open when the spindle is locked. (Fig. 1). Releasing of the spindle (Fig. 2) moves Pin A upward to operate and close motor circuit.

MICRO *Precision Switches*

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TRADE MARK
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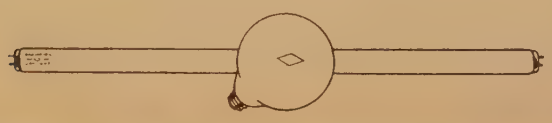
Fluorescent and Incandescent Lamps

Reduced eyestrain, conserved nervous energy, sharply diminished accident hazards, infinitely pleasanter working conditions and improved morale — all are the result of good lamps and lighting.

Champion makes the lamps, specially for industrial service, and provides a consulting service on lighting engineering *without charge or obligation.*

Champion industrial distributors are ready to supply your lamp needs with the utmost efficiency at lowest cost, lighting effectiveness and lamp performance considered.



CHAMPION LAMP WORKS
Lynn, Massachusetts
A DIVISION OF CONSOLIDATED ELECTRIC LAMP CO.

Plant Equipment Previews

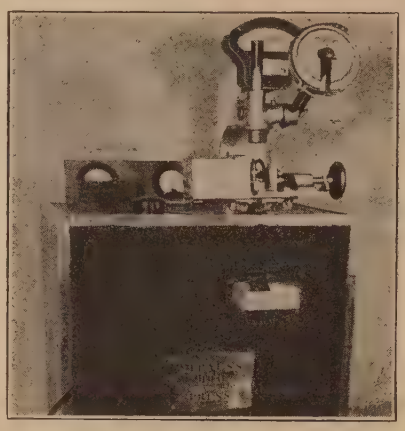
(*Continued from page 210*)

acetylene alone, provides an ideal flame for body soldering, tinning, silver soldering and heating jobs. Two tips are furnished with the kit, one for light duty and one for body soldering respectively.

MARCH, 1947
PEP 69

HOT POWDERED-METAL PRESS

Selection Board's Opinion: Saves time and should increase production.



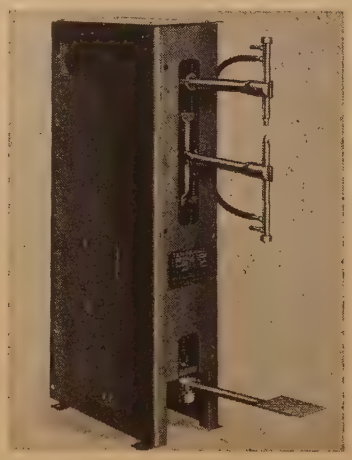
Manufacturer: National Diamond Hone and Wheel Co., 108 Fulton St., New York.

Features: Hot-presses all types of non-ferrous metal and metal-alloy powders, such as copper, tin, nickel and zinc. Weighs 150 lbs., and measures 24" x 24" x 36". Resistance heating of carbon die accomplished by simply connecting heating unit to 115-volt AC circuit.

MARCH, 1947
PEP 70

PRESS-TYPE SPOT WELDER

Selection Board's Opinion: Good method of aligning.

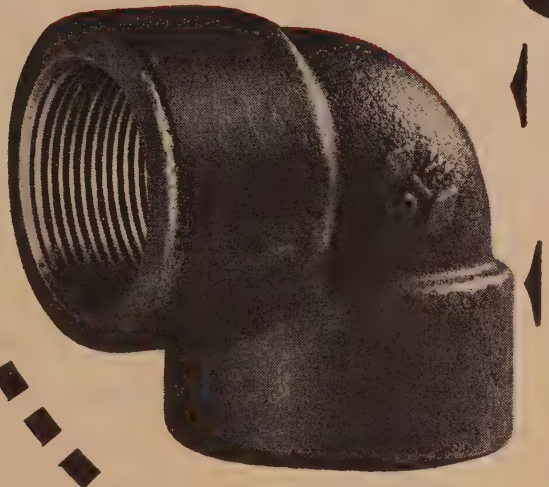


Manufacturer: Federal Machine and Welder Co., Warren, Ohio.

Features: Applies welding pressure in a straight vertical movement of the upper electrode, and represents a departure from the "radial" pressure approach of the rocker arm type. Occupying less than half

(*Continued on page 214*)

FORGED For
Strength
Toughness
Durability



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ASSURES
Correct alignment - Smooth bore
Uniform wall thickness
Clean sharp threads
Properly proportioned
deep sockets

Socket welding fittings available
for use with Schedules 40, 80, 160 and double extra strong pipe.
Screw end fittings available in three classes, 2000 lb., 3000 lb. and 6000 lb.
Each type can be furnished in carbon steel, carbon molybdenum
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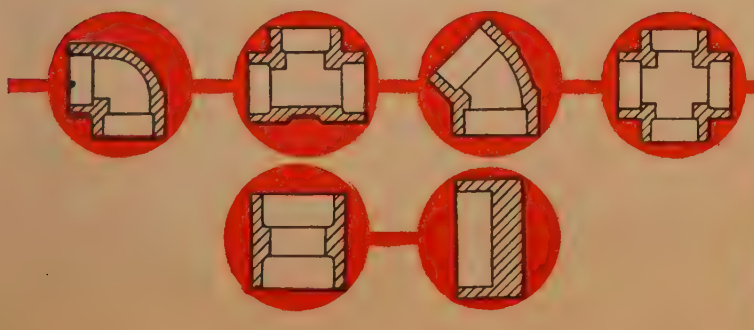

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the right line for the right blade

THE Star line is the right line because it's *really complete.* At your Star supplier you'll find a blade for every job a hack saw or band saw can do. In addition, you'll get the *right* blade because your Star supplier is backed by *a complete line* of blades that have *proved faster, longer wearing,* in cutting metals, plastics, and other non-metallics. So, add it up any way you like, Star blades, frames and band saws, amount to *more* economy, *more* convenience, and *more* satisfaction. Yes, you can't go wrong when you see your Star supplier — he has the right line, the right saw *for you.* It's Star.

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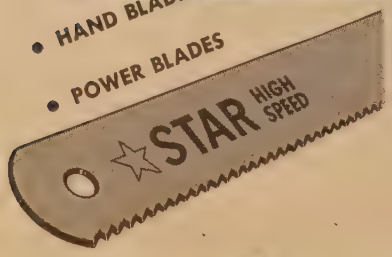
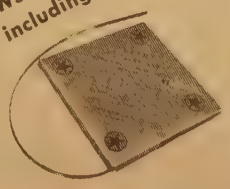
• HAND BLADES
• POWER BLADES



• FRAMES

• BAND SAWS
(Metal Cutting, including Skip-tooth)



Sold only through recognized distributors

CLEMSON
CLEMSON BROS., Inc., Middletown, N. Y.
Makers of hand and power hack saw blades, frames, metal cutting band saw blades and the Clemson D-17 lawn machine.

Plant Equipment Previews

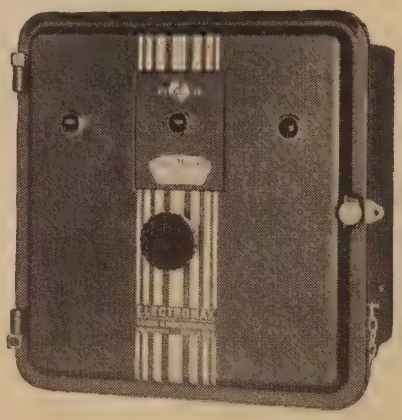
(*Continued from page 212*)

the space required by the conventional spot welder (9" x 20") its extremely narrow frame permits greater variety of angular work, less need for extra long horns.

MARCH, 1947
PEP 71

TEMPERATURE CONTROLLER

Selection Board's Opinion: Has many useful applications.



Manufacturer: Leeds and Northrup Co., 4934 Stenton Ave., Philadelphia 44, Pa.

Features: Has high sensitivity and versatility and needs practically no attention. Consists of a Wheatstone bridge with a vacuum-tube amplifier as the detector. It is completely AC operated. Being only a controller, not a recorder, the minimum of mechanism involved practically makes it a "zero maintenance" instrument. Ranges: from 0 to 250 deg. F. and 0 to 1000 deg. F., or 0 to 150 deg. C and 0 to 550 deg. C.

MARCH, 1947
PEP 72

MIDGET SIZE FIRE EXTINGUISHER

Selection Board's Opinion: Lightweight and easy to use.

Manufacturer: American-LaFrance-Foamite Corp., Elmira, N. Y.

Features: Is only 3-9/16" in diameter with an overall length of 22". It is operated by quick acting squeeze-type valve which releases the carbon dioxide extinguishing agent by palm-pressure. The contents which expand, upon release, to 450 times their contained volume, only weigh 3⅝ lbs.

(*Continued on page 216*)

SAFE • ECONOMICAL

For OIL, GAS, GASOLINE AMMONIA AND FREON SYSTEMS

Seals threaded joints and flanges with or without gaskets. Anti-seize; will not harden in the joint. Vibration resistant. Ready to use. Applicable at all presently used temperatures and pressures.

One of KENITE'S Time-tested, Safe Chemical Heating Specialties.

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DUFFIN IRON COMPANY
Established 1876

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For Service and Dependability Have it Fabricated by Duffin!

Cost of machine frame reduced 50% by change to welded design

BY LOUIS FAULB, PRESIDENT
KLEEN-KUT MANUFACTURING COMPANY
CLEVELAND, OHIO

Production cost of the frame of the Kleen-Kut meat saw manufactured by our company has been reduced more than 50% by redesigning it for fabrication by arc welding. The former design and the latest welded design are shown in Fig. 1.

The new design has reduced machining operations 60%, has made the machine six times as rigid, cut its weight from 550 to 350 pounds, and has doubled the production output of the same floor area.

The changeover to all-welded design was an evolutionary process over an 18-month period.

We started with the table frame shown in Fig. 3, and the cost reduction encouraged us to redesign the whole machine. Since our original all-welded design, we have made 40 improvements. If we had used conventional fabricating methods, 40 modifications or complete changes in patterns would have been necessary. Open views of the original welded design and the latest welded design are shown in Fig. 2.

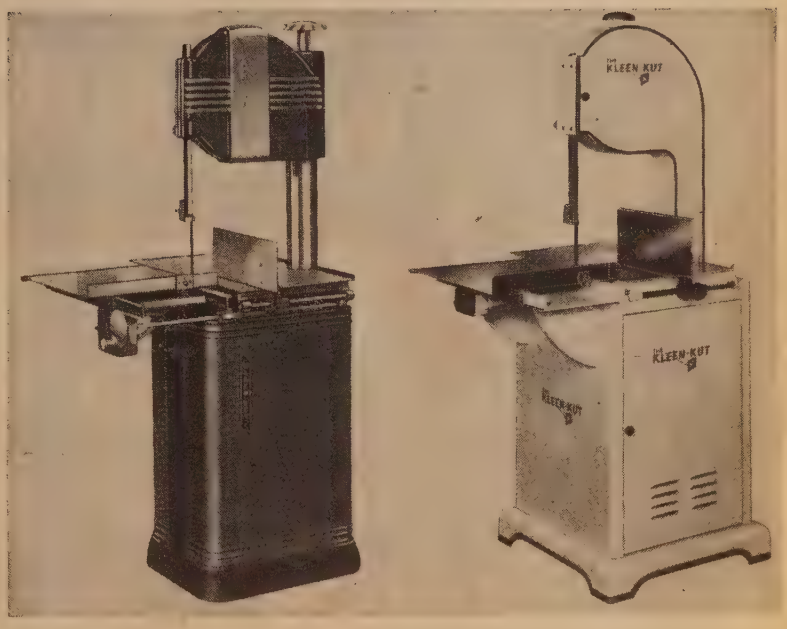


Fig. 1. Saw of former conventional design (left) and all-welded design (right).

IMPROVES THE PRODUCT

Welded design has increased the saw's overall rigidity and strength. The top pulley support, subject to considerable stresses, was stiffened by simply welding a 32-inch length of angle vertically inside the housing. Rigidity was further aided by widening the main frame to the full length of the base and redesigning the door.

Adjusting the saw blade tension in the former model required moving the entire head of the unit up or down, which took too much time. In the new design this adjustment is made by simply turning a rod. To incorporate this feature in the former design would have meant an excessive amount of machining.

INTERMITTENT WELDS USED

The new saw frame is made largely of formed plates, reinforced at strategic stress points with gussets and cross-braces. A minimum of material and welding is used, most parts being fused with intermittent welds like those in the table frame (Fig. 3). This type of welding obtains proper strength, avoids distortion and speeds production.

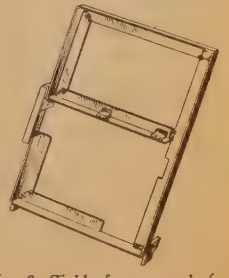


Fig. 3. Table frame, made from angles. This is the first part that was changed to welded design.

The table frame is constructed of 1½-inch angles with ½-inch bearing brace. The machine base consists of four ¼-inch plates joined by fillet welds in open corner joints. The main stand is 3/16-inch-thick steel sheet with inside fillet joints. Bearing and pin bosses are solid welded into the structure. Hinged covers are 14 gauge steel sheet.

Wherever possible, welding is done on the inside of the joint to give a smooth exterior appearance. Because materials are light-weight, all parts can be easily handled for bench-welding.

The reduction in machining operations has enabled us to double our production within the same floor area. Materials-procurement has also been simplified. Previously we ordered parts from seven outside firms; now we make them all in our own plant with simple, low-cost production facilities.

In approaching redesigning problems, our engineers have been aided by the Studies in Machine Design issued periodically by The Lincoln Electric Company. These are available free to engineers and designers who write The Lincoln Electric Company, Dept. 341, Cleveland 1, Ohio.

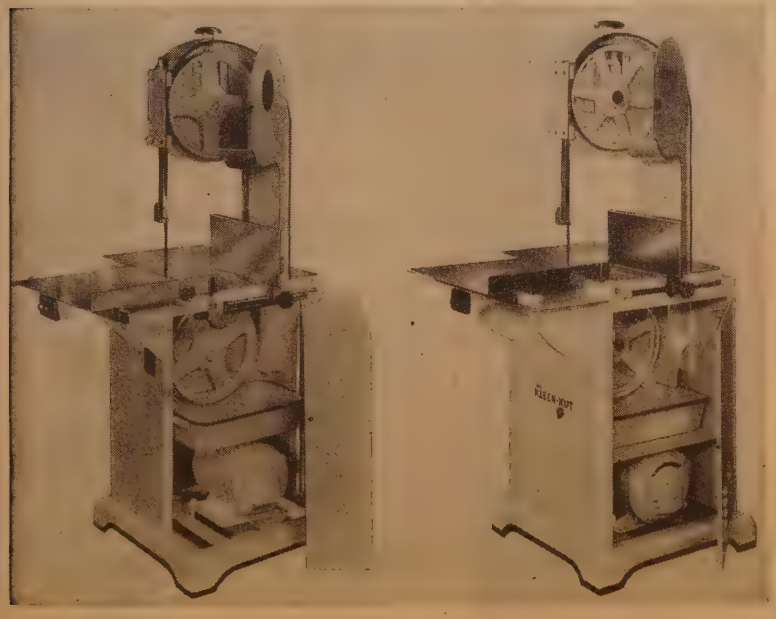
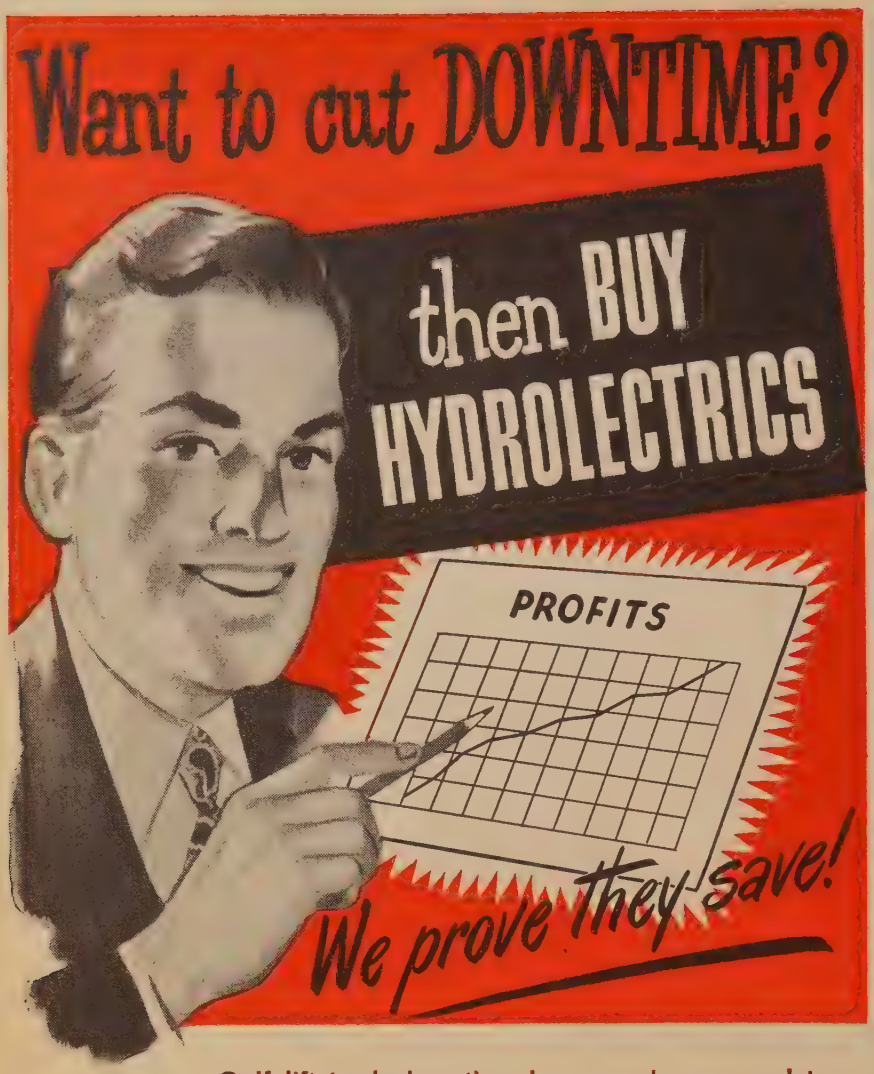


Fig. 2. Original welded design (left) and latest welded design (right) with covers open to show interiors.

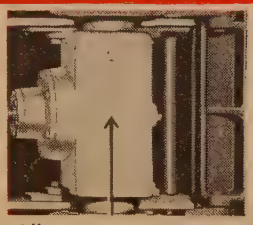
(Advertisement)



● If lift truck downtime has you down . . . let a Hydro*Lectric* pick up your load. Plants country-wide report that these rugged, low-cost trucks are setting amazing performance records,* hauling bigger loads . . . running longer hours . . . and serving up to 24 hours daily with negligible downtime.

From the smooth running and easy-steering dual front wheels to the alloy gear transmission, every part of the Hydro*Lectric* is designed and built to give constant service. Spiral, bevel and spur gears, all ball bearing mounted, develop the power necessary to move 2-ton loads with effortless ease. The transmission case is fully sealed against abrasives and other foreign matter.

* Lift Truck representatives will be glad to supply full details of typical case histories . . . show how the Hydro-*Lectric* can do your job faster . . . better . . . more economically. Write to Mr. W. C. Stuebing for Folder K.



Alloy Gear Transmission, rear drive through sets of spiral, bevel and spur gears.

Patented and Engineered by W. C. Stuebing

LIFT TRUCKS INC. W.W.W. STUEBING CINCINNATI

LIFT TRUCKS, INC.
Walter Stuebing, *President*
2425 Spring Grove Ave. Cincinnati 14, Ohio

Plant Equipment Previews

(*Continued from page 214*)

MARCH, 1947
PEP 73

BOOSTER PUMP

Selection Board's Opinion: High pressure use.

Manufacturer: National Research Corp., Boston 15, Mass.

Features: A 6" diffusion pump designed to work at higher than ordinary pressures. Full speed of 1200 CFM or more is maintained from 1.5 to 7 microns of mercury, while at 100 microns the pump is handling 240 CFM. Recommended operating range is 0.5—300 microns and blank-off occurs at 0.008 microns.

MARCH, 1947
PEP 74

DRIVERS FOR SMALL SCREWS

Selection Board's Opinion: Useful where many small screws are used.

Manufacturer: Keller Tool Co., Grand Haven, Mich.

Features: Two models, one with a free speed of 2500 rpm for driving free-running screws up to No. 3 size and very small self-tapping and wood screws and the other with a free speed of 10,000 rpm for screws in the No. 3 to No. 6 range. Both include the pneumatic pick-up to enable the operator to pick up screws with the air suction finder and drive directly to the work.

MARCH, 1947
PEP 75

FURNACE FOR AUSTEMPERING AND MARTEMPERING

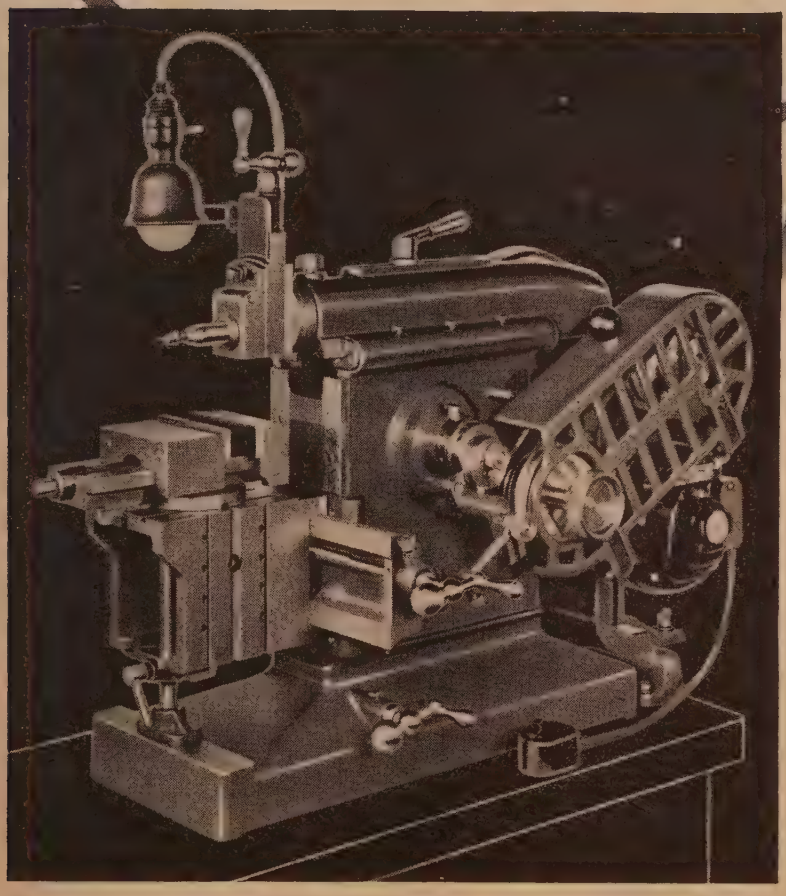
Selection Board's Opinion: Good cooling design.

Manufacturer: The A. F. Holden Co., New Haven 8, Conn.

Features: The parts are quenched into the furnace and cooled to the point where they are at both temperatures and then cooled to the finished transformation of martensite. Inasmuch as the unit for cooling is self-contained, the method of heating may be with electricity or gas. Operation of unit is from 350-750 deg. F. At the lower temperature for Martempering and from 500-750 deg. for Austempering.

(*Continued on page 218*)

Yes Sir — for all kinds of Precision Work LOW PRICED AMMCO 7" SHAPER is a honey!



AMMCO 7″ SHAPER — Bench Model

with swivel vise and wrenches, including 4 step V-pulley, adjustable countershaft, motor driven pulleys, 2 V-belts, adjustable lamp and switch. Belt guards and motor, extra. Net weight 175 lbs., shipping weight 225 lbs.

AMMCO 7″ SHAPER — Portable Cabinet Model

complete with swivel vise and wrenches, including 4 step V-pulley, adjustable countershaft, motor driven pulleys and 2 V-belts, with belt guards; ⅓ H.P. Motor, 110 Volt, 60 Cycle, single phase and with overload switch; mounted on a maple cabinet with casters and handle for portability, and including adjustable lamp, completely wired and ready for operation. Net weight 300 lbs., shipping weight 400 lbs.

IT SAVES TIME...LABOR... CUTS PRODUCTION COSTS WAY DOWN

You can take it from me, our AMMCO 7 inch SHAPER is doing a job for us that saves time, cuts down production costs, makes money for us like no other shaper ever has.

There isn't a big machine that surpasses it in accuracy. It saves you time, floor space and expense in set-up operations . . . uses less electricity, is the perfect shaper for jobs requiring a 7″ stroke or less.

At its low price, it's a buy you can't beat . . . precision guaranteed because AMMCO *builds the skill into the machine!*

Write now . . . today for specifications and prices. Address Dept. MF-37.

AMMCO TOOLS, INC.

COMMONWEALTH AVENUE — NORTH CHICAGO ILLINOIS

(Formerly Automotive Maintenance Machinery Co.)

THE SKILL IS BUILT INTO AMMCO MACHINES

LOW-COST PROTECTION FOR
HEAVY TRAFFIC FLOORS!

COSTS LESS THAN 6c PER SQUARE FT.

Here's hard-to-beat economy! Rubberlike, the modern composition floor runner with rugged corrugations protects all heavy traffic areas for less than 6c per square foot! Widely used in factories, offices, schools, hotels, cafes, institutions, it quiets footsteps — makes slippery floors safe. Skidproof even when wet. Easy to clean, Rubberlike runner needs no special upkeep, can be put down without cementing. Won't curl at edges. Amazingly durable — and doubly desirable because of its "petty-cash" cost! In rolls, 27 in. by 100 ft. or 36 in. by 75 ft. Order from supply house or write for sample. Bird & Son, inc., 167 Washington Street, East Walpole, Mass.

RUBBERLIKE* Runner

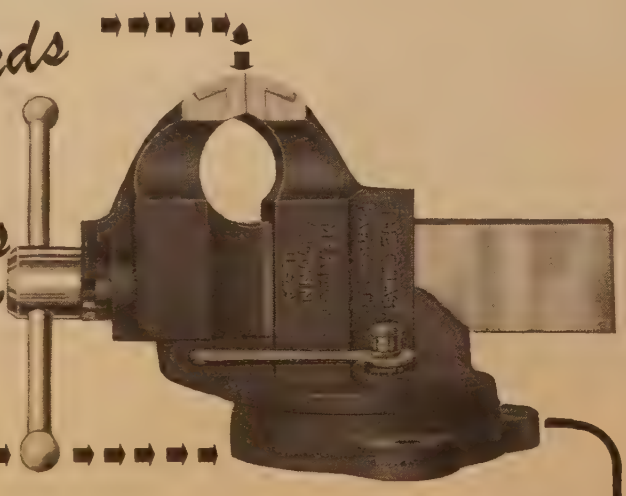
BIRD NEPONSET PRODUCTS

PATENTED NON-RUBBER CONSTRUCTION

*Reg. U. S. Pat. Off.

BIRD & SON, inc., EAST WALPOLE, MASS., NEW YORK, SHREVEPORT, LA., CHICAGO

Both Ends are "Business Ends"



● From steel jaws to brake type swivel base, Parker Vises assure one all-important essential — "welding" the work to the bench.

Supplementing these "business ends" are other famous features... Extra strong underportion... Oversize steel screw and malleable iron nut... Tool steel jaws for long service... Tension spring handle... Base locks firm all the way around.

Make your next buy Parker Vises! Your distributor will be glad to furnish you with full details. The Charles Parker Company, Meriden, Connecticut.

PARKER VISES
America's First Vise Maker

Plant Equipment Previews

(Continued from page 216)

MARCH, 1947
PEP 76

LIGHTWEIGHT PALLET LIFT TRUCK

Selection Board's Opinion: Overload prevention feature is good.

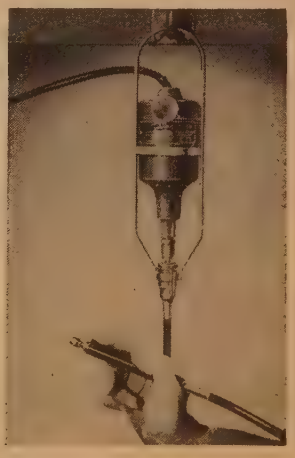
Manufacturer: Lyon-Raymond Corp., 3215 Madison St., Greene, N. Y.

Features: Total enclosure protects working parts. Use of high strength alloy steel formed into box sections for the frame and aluminum alloy for wheels and other parts insures minimum of weight. Elevation accompanied through hydraulic foot pump, equipped with a relief valve to prevent overloading.

MARCH, 1947
PEP 77

ELECTRIC HANDGRINDER

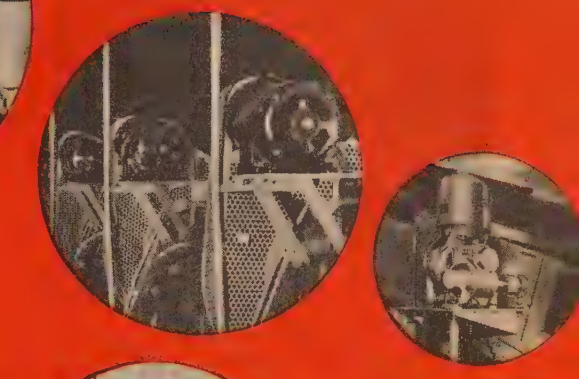
Selection Board's Opinion: Can be used by hand or on machine.

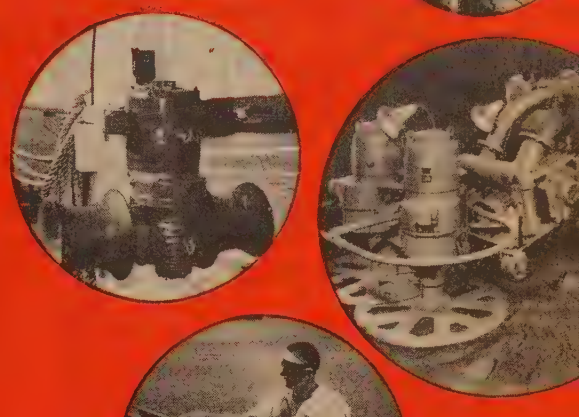


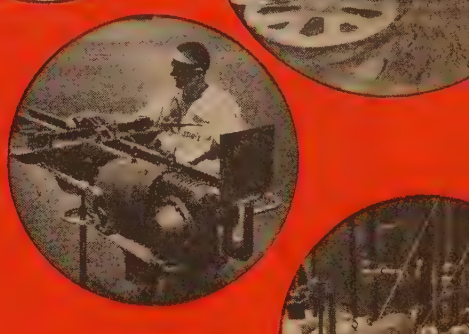
Manufacturer: The Dumore Co., Racine, Wisc.

Features: A dual purpose tool for use either as a straight handgrinder or with an attachment converting it to a flexible-shaft tool. A full 1/14 HP motor with "long-life" sleeve bearings supplies the power. Its chuck has 1/4" capacity, and can be adapted to 3/32" and 1/8" shank tools with collet sleeves provided. Can therefore be adapted to a variety of jobs in wood, metal and plastics—sanding, grinding, sawing, etc.

(Continued on page 220)







the RIGHT *horsepower*
the RIGHT *shaft speed*
and RIGHT *where you want it*

Don't put up any longer with make-shift assemblies when you can get the RIGHT horsepower, the RIGHT shaft speed, the RIGHT construction features, the RIGHT mounting . . . all combined into one compact power package.

Master Gearmotors, available in millions on millions of combinations of types and ratings, permit you to use a power drive on each job that's just right . . . a power drive that will add greatly to the compactness, appearance, and economy of each of your applications.

Use Master Gearmotors to increase the salability of your motor-driven products . . . improve the economy, safety, and productivity of your plant equipment. They're the horse sense way to use horsepower.

MASTER GEARMOTORS

THE MASTER ELECTRIC COMPANY • DAYTON 1, OHIO

DANGEROUS BUSINESS

—leaving fingerprints on any metal!

Corrosion starts more rapidly where dirt contaminates metal. Fingerprints are generally "invisible dirt"—an insidious source of contamination in any plant where metal is handled. Solvent-cleaned surfaces marred by fingerprints will fail by corrosion in 1/10th the time clean surfaces will!

NOX-RUST 310 AC

is the most widely used of all our products because of its versatility. It combines successfully four important properties:

1. removes fingerprints
2. displaces water and coolants
3. dissolves salt and acid residues
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Customers report substantial savings, fewer spoiled and rejected parts, by use of 310 AC. If your plant "handles" metal in any form, such savings are available to you. Clip coupon below to letterhead and mail today for full details, prices, and name of nearest distributor.

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Dept. 333, Chicago 8, Illinois

Information and prices on Nox-Rust 310 AC, please!

NAME_____

COMPANY_____

ADDRESS_____

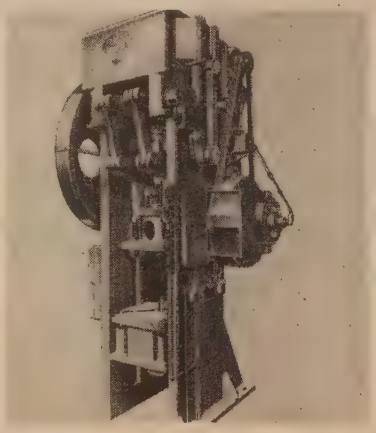
Plant Equipment Previews

(*Continued from page 218*)

MARCH, 1947
PEP 78

SINGLE-CRANK TOGGLE PRESSES

Selection Board's Opinion: Welded features good.



Manufacturer: E. W. Bliss Co., Detroit.

Features: The line consists of 8 sizes ranging from 4¼" to 7" diameter and from 8½" to 24½" stroke length. Designed for deep drawing operations on steel, brass, copper, aluminum and other metals, they feature steel-weldment construction, resulting in weight-saving and reduced floor space requirements. The machines have steel gearing, fully guarded to 8' above floor level.

MARCH, 1947
PEP 79

WIRING FITTINGS

Selection Board's Opinion: Provide high and low potential sources in one unit.

Manufacturer: National Electric Products Corp., Chamber of Commerce Bldg., Pittsburgh, Pa.

Features: Service Fitting No. 7903 with its standard duplex T-slot receptacle is to be used for high potential and power wiring. Telephone and low potential wiring are serviced with Service Fitting No. 7904. Both are component parts for the underfloor wiring distribution system.

MARCH, 1947
PEP 80

DUST COLLECTOR

Selection Board's Opinion: Easy to clean.

Manufacturer: Dust Filter Co., 160 N. La Salle St., Chicago 1, Ill.

Features: Unlike most tubular units which

(*Continued on page 222*)

"I like to see a man take such pride in his machine."

N.Y.B. & P. Distributors Are Always Looking for Trouble...

It's an old habit of theirs . . . and a good one, as many a manufacturer will tell you.

For when it comes to mechanical rubber goods, your N.Y.B. & P. Distributor will go all out to help you. He'll anticipate trouble so he can *stop* it before it comes to you.

He'll make certain you get the *right* item and the *right* kind of service—even if it means providing engineering aid.

If you're pressed for time, he'll get things moving fast —even when the material's hard-to-get.

But that isn't all. The N.Y.B. & P. Distributor keeps right on looking for trouble.

—figuring out what you're likely to need in the future to meet the changes you're running into right now.

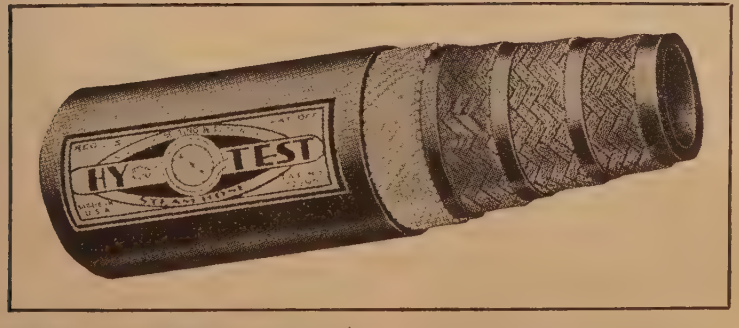
—studying every new wrinkle in mechanical rubber goods that may prove useful to you tomorrow.

And he is ready at all times with the advice that only a long and varied experience can provide.

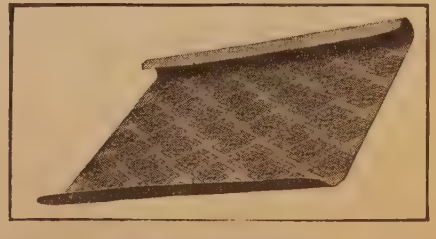
NEW YORK BELTING & PACKING CO. Founded 1846

Over 100 years of Service to Industry

See your N.Y.B. & P. *Distributor for such Mechanical Rubber Goods as:*



HY-TEST STEAM HOSE—Users of this hose need never fear it will burst. Instead of cotton, it has inner plies of braided steel wire. Spiral cord asbestos final ply, heat-resistant rubber cover. It cannot burst.



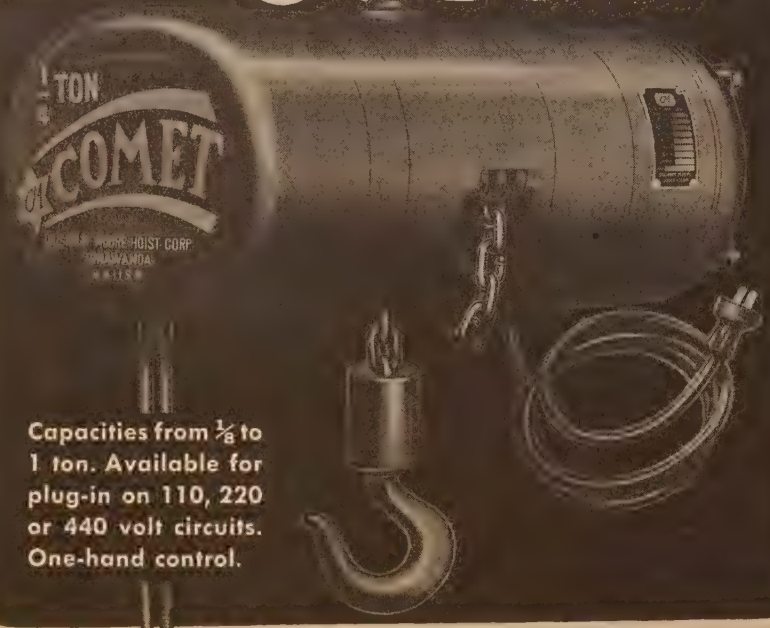
FIRO SUPER HEAT SHEET PACKING—for packing flanges or joints against steam, air, ammonia, gasoline, hot or cold oil, acids, alkalines. Excellent on high pressure stillheads. Non-absorbent, does not disintegrate, burn or ooze out of a joint. Made of long fibre asbestos.

NEW YORK BELTING & PACKING COMPANY

1 MARKET STREET, PASSAIC, NEW JERSEY

Electric Hoist-Power COSTS LESS

CM COMET



Capacities from ⅛ to 1 ton. Available for plug-in on 110, 220 or 440 volt circuits. One-hand control.

- ECONOMICAL
- PORTABLE
- SPEEDY
- STURDY

Manual handling of materials is inefficient . . . more so today than ever before. The CM Comet makes substantial savings in materials handling costs . . . is doing it every day in thousands of plants. Possibly the CM Comet can save a good many dollars for you too. Check up on the materials handling situation in your plant. CM Bulletin 138 . . . available for the asking . . . will bring you complete details about the Comet.

CHISHOLM-MOORE HOIST CORPORATION

(Affiliated with Columbus-McKinnon Chain Corporation)

GENERAL OFFICES AND FACTORIES: TONAWANDA, N. Y.

SALES OFFICES: New York • Chicago • Cleveland • San Francisco • Los Angeles

Plant Equipment Previews

(Continued from page 220)

depend on the filter tubes solely to separate the dust from the air, this unit causes the separation of a high percentage of the dust at point of intake. This feature results in little maintenance being required for the filter tubes. A static pressure of 6½" is maintained constantly. Size: 4' high, 2' square. Has 1½ hp. 3 phase 220-440 volt motor.

MARCH, 1947
PEP 81

TRIODE FOR ELECTRONIC HEATING

Selection Board's Opinion: Permits intermittent operation.

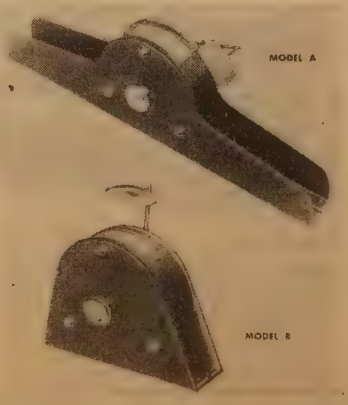
Manufacturer: General Electric Co., Thompson Road, Syracuse, N. Y.

Features: Furnishes 6 kw tube power under class C conditions for dielectric heating applications. Operates with high plate voltage to match high-impedance load and functions up to 50 megacycles at maximum plate input. Is designed for intermittent operation. The three-electrode tube has filament voltage of 12.6, current of 56 amps.

MARCH, 1947
PEP 82

VERNIER ANGLE GAGE

Selection Board's Opinion: Easy to set angles.



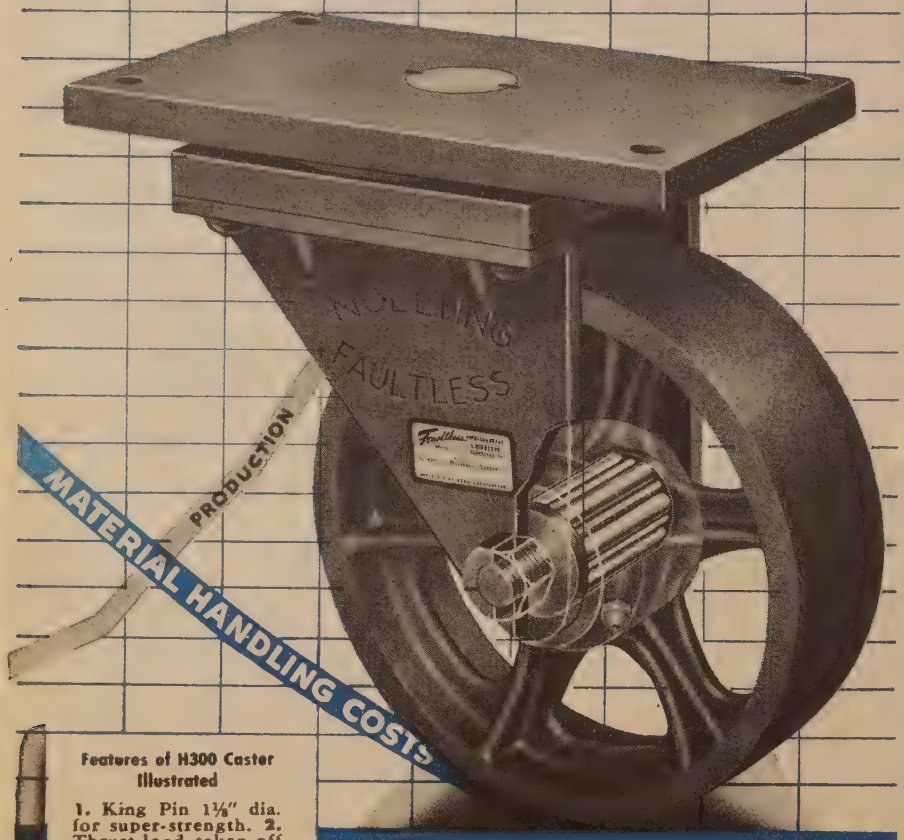
Manufacturer: Engis Equipment Co., 431 S. Dearborn St., Chicago, Ill.

Features: Made with all aluminum housing for lighter weight, this clinometer is most

(Continued on page 224)

AIR TOOLS
Pack BIG POWER in small Size!
Model 7020 Screw Driver
Actual Size
Give every worker *exactly the right tool* for his job! For example—ARO Air Screw Driver Model 7020 for No. 4 to No. 10 screws. For midget screws, No. 1 to No. 4—ARO Model 7000 midget screw driver! In the complete ARO line, a wide range of precision-built Air Tools for screw-driving, nut-setting, drilling, grinding and other production jobs. Get top-speed, trouble-free performance . . . specify ARO! See your Aro Jobber. Write for catalog. The Aro Equipment Corporation, Bryan, Ohio.
by ARO

CUTTING COSTS is our BUSINESS



Features of H300 Caster Illustrated

1. King Pin 1⅛" dia. for super-strength. **2.** Thrust load taken off King Pin by recessing ball race of cone into top plate. **3.** Double Ball Bearing swivel construction. Hardened bearings—large diameter hardened raceways. **4.** Castellated nut for fine adjustment. **5.** Reinforced ribs for extra strength. **6.** Heavy roller bearing axle. **7.** Husky wide-tread wheels. **8.** Handy grease connection. **9.** Uniform overall height.

Cutting materials handling time (accounting for over 20% of industry's man-hours) provides your greatest opportunity for gains in worker productivity—unit output. The shortest distance between receiving and shipping room doors is a fast, fluid production line on Faultless *Engineered* Casters. Loads up to 9 tons per Caster are quickly swiveled and moved without need of cumbersome, expensive equipment. Regardless of what you make or move, there's a Faultless Caster *especially designed* to do it better. Our representative will gladly show you why, or write for literature.

FAULTLESS CASTER CORPORATION, Dept. MF-3, Evansville 7, Ind.
Branches in Principal Cities: New York, Chicago, High Point, St. Louis, Detroit, Los Angeles
Consult your classified phone directory. Canadian Factory: Stratford, Ont.

Faultless CASTERS

Plant Equipment Previews

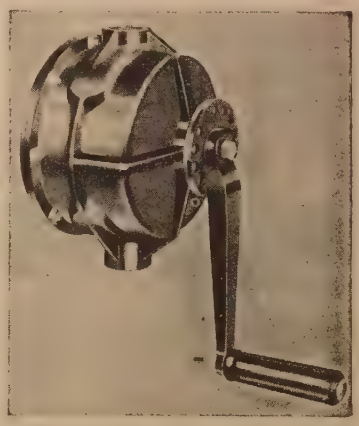
(*Continued from page 222*)

useful where accurate checking is required. It is useful on almost any type of machine tools. Action of the instrument is by a free swinging drum graduated 360 degrees, supported by ball bearings. Reading accuracy of Vernier is 1 minute of arc. It can be used in all temperatures.

MARCH, 1947
PEP 83

HAND TRANSFER SHALLOW-WELL PUMP

Selection Board's Opinion: Should be free from contamination.



Manufacturer: Bogue Electric Co., 42 Iowa Ave., Paterson 3, N. J.

Features: Will deliver 10 GPM at normal cranking speed of 60 turns per minute and 15 GPM at 90 turns per minute. Its rotor and shaft are supported on ball bearings, sealed in grease and do not come in contact with liquid being pumped, insuring long trouble-free life. Will handle almost any type liquid.

MARCH, 1947
PEP 84

RUST PREVENTIVES

Selection Board's Opinion: Good means of guarding against rust.

Manufacturer: E. F. Houghton and Co., 303 W. Lehigh Ave., Philadelphia, Pa.

Features: Nine products, 4 of the thin-film solvent type, one a non-removable dielectric variety and the other four, oil type films varying in viscosity from thin oil film character to a medium grease consistency.

(*Continued on page 226*)

When you need a trouble-shooter...

Call this man! He's your Industrial Supply Specialist. And he's available to help find the correct answer to your problems.

He knows, for example, how important an everyday product like water hose can be to production and maintenance operations.

That's why your Industrial Supply Specialist will recommend Monarch Water Hose for those heavy-duty industrial uses where *extra* strength and durability are required.

You see, Monarch Water Hose is "Job-Engineered" by Hewitt to stand up under the most severe working conditions. Extra strength is assured by supporting plies of high-tensile fabric. And Monarch's thick cover is highly resistant to cutting and abrasion. Not only that, but because Monarch is light and flexible, your men can handle it easily and quickly.

So remember, whenever you need a trouble-shooter, call on your Industrial Supply Specialist. His knowledge, experience and willingness to be of service will save you time and money.

Specify "Hewitt" . . . Phone the Hewitt distributor listed in the classified section of your telephone directory. Or write to Hewitt Rubber of Buffalo, 240 Kensington Avenue, Buffalo 5, New York.

Monarch Water Hose

HEWITT RUBBER
OF BUFFALO
Division of Hewitt-Robins Incorporated
"JOB-ENGINEERED" INDUSTRIAL HOSE • BELTING • PACKING

VARIED SOLUTIONS FOR PRECISION

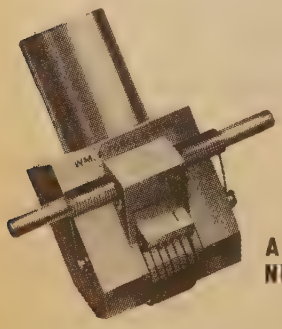
MARKING

PRYOR STEEL TYPE

Pryor Interchangeable Steel Marking Type is engraved—not swaged—on modern, three-dimensional pantographs to avoid unnecessary stresses and strains.

Made from fine Sheffield alloy tool steel, carefully tested in Pryor laboratories for flaws and impurities. Each individual piece of type is Rockwell hardness-tested, too, after heat treatment.

Perfect alignment and uniform depth are assured by microscopic inspection for fine finish, good bevel and absolute centering of character.



FORCE AUTOMATIC NUMBERING HEAD

The Force Model 23 Numbering Head does a precision job of sharp, clean-cut indenting on metal and other materials.

The deeply-engraved figure wheels cut numbers cleanly and legibly in a single hand or heavy power press.

The Force Numbering Head has a full stroke swing . . . hub-type wheels, heavy duty case, oversized ratchets and pawls, features that make this numbering head reliable and long-lasting under the severest conditions.

Lever action for either consecutive or repeat. Regularly made with 7 or more wheels with Gothic or Roman numerals.

Write us for specifications, size and price information.

WM. A. FORCE & CO.
INCORPORATED

107 Worth Street, New York 13, N. Y.
3000 West Chicago Avenue, Chicago 22, Ill.
682 Mission Street, San Francisco 5, Cal.
3652 Northcliffe Ave., Montreal 28, Canada

Plant Equipment Previews

(*Continued from page 224*)

MARCH, 1947
PEP 85

BUFFING COMPOUND APPLICATOR

Selection Board's Opinion: Easy to install.

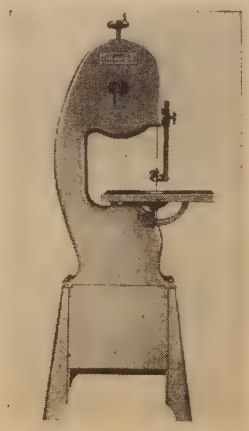
Manufacturer: George L. Nankervis Co., 5442 Second Blvd., Detroit 2, Mich.

Features: Has an intermittent feed control at rate of 14 strokes per minute, affording a feed range of from .0015 to .015 per stroke. Can be mounted on any automatic machine and is adaptable from the simple to the complex multiple-stage buffing operations. 110, 220, or 440 volt motors are available.

MARCH, 1947
PEP 86

ALL-PURPOSE BAND SAW

Selection Board's Opinion: Useful for all types of materials.



Manufacturer: The Livingstone Mfg. Co., South Gate, Cal.

Features: Can be successfully used for wood, plastics or metal. The vertical clearance is of exceptional depth, 10", while the horizontal measurement is 13¾". The wheels are balanced, double row, ball bearing. The blade is installed at the back of the saw unit, assuring the operator greater protection.

MARCH, 1947
PEP 87

FLEXIBLE GAS TUBING

Selection Board's Opinion: Flexible and easy to connect.

Manufacturer: Carbo-Flex Hose Co., 5452 Vineland Ave., N. Hollywood, Cal.

Features: Comes with a Wiggins quick

(*Continued on page 228*)

Free literature—

Post card between

pages 168 & 169

NOW LOW COST EASY TO USE
CAPCO
DOCK COVER

PATS. PEND.

COMPLETELY ENCLOSES THE SPACE BETWEEN DOCK and CAR DOOR (TOP-SIDES-BOTTOM) NO MORE TIME LOST IN BAD WEATHER.

- PAYS FOR ITSELF QUICKLY
- EASY TO INSTALL
- EASY TO OPERATE
- DURABLE—LONG LIFE
- PREVENTS ACCIDENTS
- FIRE PROOF—WATERPROOF

Simple, rugged, perfectly balanced construction easily operated by one man. Capco Dock Cover pays for itself many times during the years of trouble free service it gives because it insures against lost time, wet merchandise, loss of heat or refrigeration and reduces accidents. Makes every freight handling hour productive—profitable.

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ASK YOUR INDUSTRIAL EQUIPMENT DEALER

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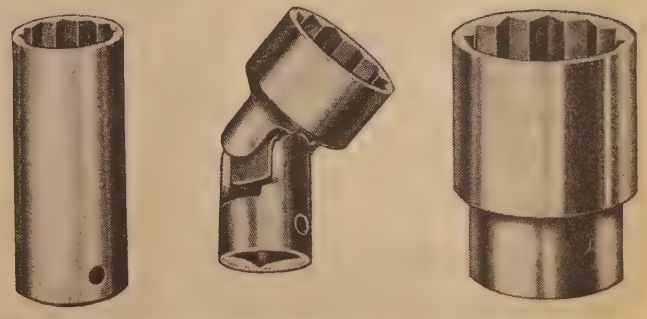
ALLEN

FLUX
for SODERING
BRAZING
WELDING

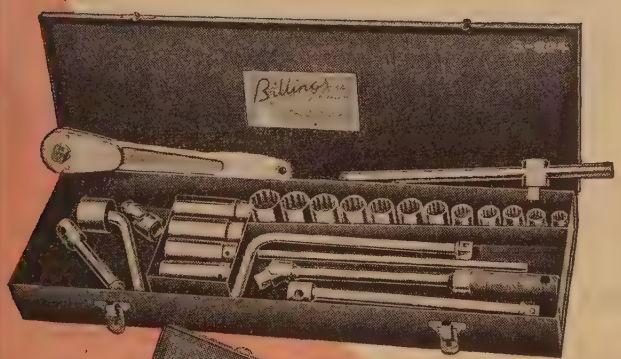
ALLEN
REG. U.S. PAT. OFF.

L. B. ALLEN CO. INC.
6733 Bryn Mawr Ave. • Chicago 31, Illinois

BILLINGS *Sockets*



DEEP WALL UNIVERSAL REGULAR



HOT FORGED

. . . from selected steel.
Thin walls and strong, too!
3/8" - 1/2" - 3/4" Square Drive

CRAFTSMEN SINCE 1869

THE BILLINGS & SPENCER CO. HARTFORD 1, CONN., U. S. A.

THE MASTER OF FLAME
ANSUL
REG. U.S. PAT. OFF.
FIRE EXTINGUISHING EQUIPMENT
duGas
REG. U.S. PAT. OFF.

DRY CHEMICAL
FIRE EXTINGUISHERS

WRITE TODAY FOR CHARTS SHOWING COMPARATIVE RATINGS ON FLAMMABLE LIQUID FIRES AS DETERMINED BY NATIONALLY RECOGNIZED APPROVAL AGENCY.

Highest Ratings for Speed and Effectiveness

WITH THE NEW ANSUL-DUGAS DRY CHEMICAL
FIRE EXTINGUISHER

Speedy-fast action is the first essential in preventing major fire damage. The NEW Ansul-Dugas Extinguishers, for Class B and C fires have the highest ratings for SPEED and EFFECTIVENESS, pound for pound, as determined by impartial authority. These highest ratings mean positive put-out of your incipient fires by ANY of your employees.

STOP FIRE FASTER!
with Ansul-Dugas Dry Chemical Extinguisher

FEATURES OF THE NEW ANSUL-DUGAS EXTINGUISHER

- Greatly increased fire-killing power.
- Expert extinguishing by inexperienced operators.
- Simplified—faster operation.
- Quicker, easier, on-the-spot recharge after use.
- Greater fire-fighting effectiveness, pound for pound, dollar for dollar.
- Longer range stream and greater shielding of heat from operator.
- Increased fire-fighting capacity without increased weight.
- Engineered to resist corrosion.

ANSUL CHEMICAL COMPANY
FIRE EXTINGUISHER DIVISION, MARINETTE, WISCONSIN

Plant Equipment Previews

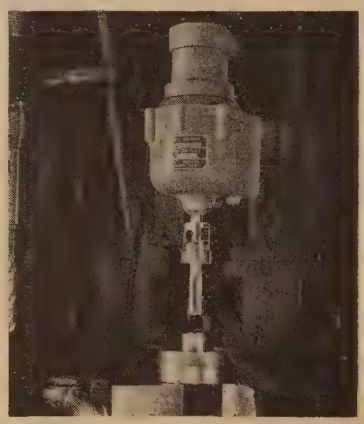
(*Continued from page 226*)

coupling at either or both ends as desired. Standard lengths are 1′ to 6′; others on order. Sizes are 1/4", 3/8", 1/2", 5/8", 3/4", 1" and 1 1/4". Tubing has acid resistant neoprene lining. Outside available in a variety of metals, and will resist hydraulic and air pressure of from 600 lbs. to 1200 lbs. according to metal used.

MARCH, 1947
PEP 88

TORQUE-DRIVEN TAPPING ATTACHMENT

Selection Board's Opinion: Applies predetermined torque.



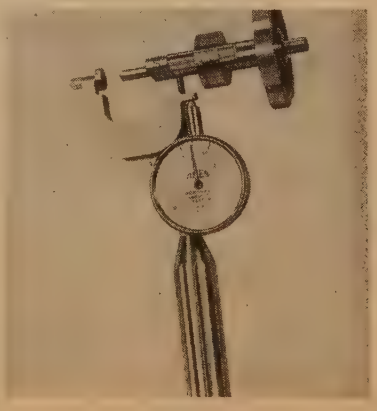
Manufacturer: The Charles L. Jarvis Co., Middletown, Conn.

Features: Available in 3 sizes, will tap from soap to copper or chrome nickel steel without an appreciable increase of the finger tip pressure required to operate an ordinary drill press. Come in standard and built in models and can be furnished to fit any drill press or tapping machine.

MARCH, 1947
PEP 89

PORTABLE HARDNESS TESTER

Selection Board's Opinion: Easy means of testing.



Manufacturer: Ames Precision Machine Works, Waltham, Mass.

Features: Measures depth of penetration in materials to determine degree of hardness. A diamond point penetrator is used in

(*Continued on page 230*)

"When you want this valve to work . . . it works"

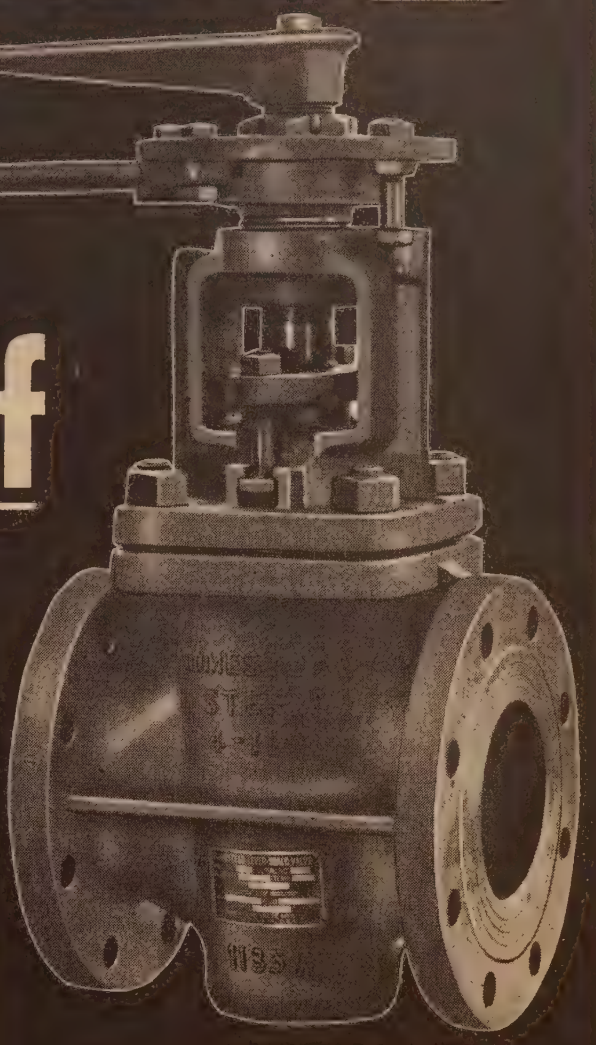
it's

Stick-Proof

because

it's

LEVER-SEALD



HOMESTEAD LEVER-SEALD VALVES operate *instantly* with only a *Quarter-Turn* . . . at all times and under all conditions . . . in services where extremes of temperature, pressure, or the corrosive action of line fluids would cause ordinary valves to stick or "seize."

That's why they have been favorites with industry for more than 15 years in all sorts of difficult applications.

They're *stick-proof*, because built right into each valve is a powerful lever and screw device that *relieves seating pressure* between plug and body just enough to overcome friction and permit *easy turning*.

This *stick-proof* construction is only one of many HOMESTEAD LEVER-SEALD VALVE features assuring long, economical, trouble-free service.

You may order HOMESTEAD LEVER-SEALD VALVES in metals and alloys to meet service requirements, in sizes from 1½" to 12" with regular or wedge gate valve face to face dimensions, for pressures from vacuum to 1500 pounds. Complete technical details and Valve Reference Book No. 38 are yours for the asking.

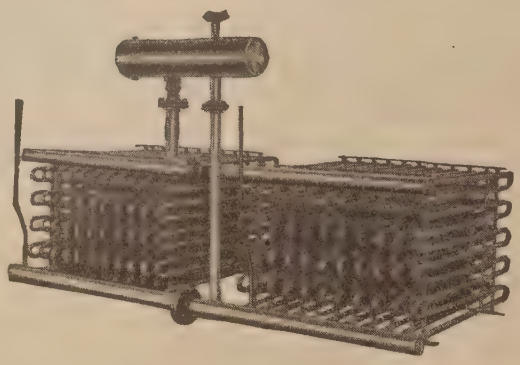
CHECK THESE OUTSTANDING LEVER-SEALD VALVE FEATURES

1. Instant stick-proof operation.
2. Quarter-turn fully opens or closes.
3. Positive mechanical seal.
4. Seating surfaces always protected in both open and closed positions. Corrosion practically eliminated.
5. Unobstructed straight-line fluid flow.
6. All operating parts protected from damaging effects of service conditions and weather.

HOMESTEAD VALVE MANUFACTURING COMPANY

P. O. BOX 87 CORAOPOLIS, PA.

IT MAY BE BIG...
IT MAY BE SMALL



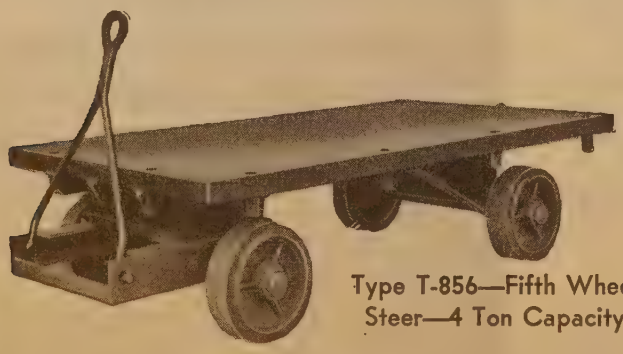
Regardless of the size and type of bend required in your installation, Swan specialized experience in bending, coiling and fabrication of piping and tubing offers you skilled engineering service, precise manufacturing facilities, and economical handling of the job from blueprint to on-time delivery.

We are prepared to submit designs, specifications and estimates on intricate coils and bends in any of the standard metals or alloys.

SWAN ENGINEERING COMPANY, Inc.
26-58 Nelson Street Bloomfield, N. J.

MERCER
"The Name that Carries Weight"
MATERIAL HANDLING EQUIPMENT

TRAILER TRUCKS



Type T-856—Fifth Wheel Steer—4 Ton Capacity

Mercer trailer trucks—available in all sizes and capacities. Model shown is built with steel deck. End and side rack sockets. Wheels mounted on roller bearings. Solid or pneumatic tires. Eye drawbar and rear coupler. Designed by engineers whose reputation is founded on doing things right. Literature available. Inquiries invited.

MERCER ENGINEERING WORKS, INC.
Plant: Clifton, N. J.
SALES REPRESENTATIVE
MERCER-ROBINSON COMPANY, INC.
30 CHURCH ST., NEW YORK 7, N. Y.

Plant Equipment Previews

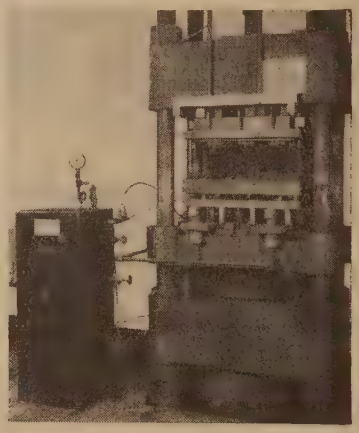
(Continued from page 228)

testing materials in the Rockwell "C" scale. A ball point penetrator is used for testing relatively soft materials in the "B" scale. A conversion chart transposes these readings to the Brinell scale.

MARCH, 1947
PEP 90

BOILER

Selection Board's Opinion: Handy for places where steam supply is unavailable.



Manufacturer: Livingstone & Co., 89 Broad St., Boston, Mass.

Features: Utilizes electricity to generate steam for pressures up to 200 lbs. per square inch and in volume up to 2 boiler HP. Solid rods for electrodes are used with the water between them being used as the resistance element. This permits the production of a sizable volume of steam—about 65 lbs. per hour—at any desired pressure, in small diameter tanks.

MARCH, 1947
PEP 91

AIR-DRIVEN MACHINE TOOL ATTACHMENT

Selection Board's Opinion: For precision jig grinding.

Manufacturer: Vulcan Tool Co., Dayton, Ohio.

Features: Quickly and economically converts jig borers and other machine tools into precision jig grinders. Has controllable speeds ranging from 30,000 to 75,000 rpm.

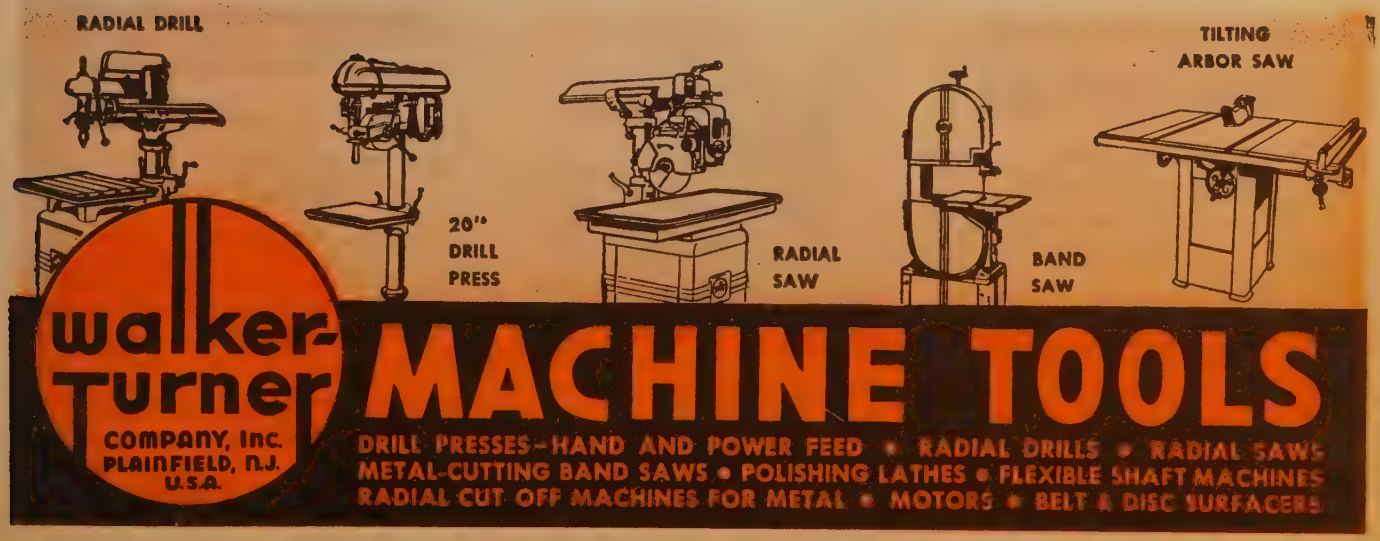
(Continued on page 232)

You can move fast IN ANY DIRECTION WITH WALKER-TURNER TOOLS

Materials, design, markets and competition are on the move. It will require alert management and a flexible plant layout to survive with profit in the days to come. Walker-Turner Light Machine Tools provide both immediate and permanent flexibility—financially and physically.

They represent the latest achievements in speed, ease of handling and safety and, because of their low cost, they write themselves off the books in a few months. When quick changes are necessary, you may choose from a wide range of speeds —and a variety of cutting tools.

Walker-Turner Light Machine Tools have extreme flexibility of application. They may be operated as bench models, floor models—in groups or as special set-ups. Plan your operations to speed up production in many directions with Walker-Turner Machine Tools—and use the guidance of your nearest Walker-Turner distributor in helping you with the know-how.


RADIAL DRILL
20" DRILL PRESS
RADIAL SAW
BAND SAW
TILTING ARBOR SAW
walker-turner
COMPANY, Inc.
PLAINFIELD, N.J.
U.S.A.
MACHINE TOOLS
DRILL PRESSES—HAND AND POWER FEED • RADIAL DRILLS • RADIAL SAWS
METAL-CUTTING BAND SAWS • POLISHING LATHES • FLEXIBLE SHAFT MACHINES
RADIAL CUT OFF MACHINES FOR METAL • MOTORS • BELT & DISC SURFACERS

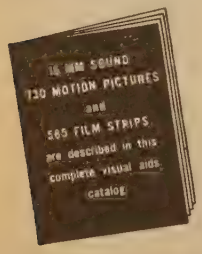
JUST OFF THE PRESS, this big new catalog describes the largest and most important group of visual aids for classroom and factory use yet produced. These low-cost training films are being widely used all over America in teaching thousands of workers and students in many fields.

They were produced by the U. S. Office of Education and other Government agencies with the complete cooperation of the foremost authorities in education and industry.

You, too, can make your teaching of difficult concepts and principles—your training of workers, easier and more effective by using these 16 mm sound motion pictures. Aid your students and trainees to *learn faster!*

A FEW EXAMPLES OF THE MANY SUBJECTS AVAILABLE

A New Supervisor Takes a Look at His Job
Safety in the Shop
Adding or Removing Refrigerant
The Airplane Mechanic
Techniques of Group Chest X-Ray Services
The Slide Rule
Veterans Report No. 1
Origin and Synthesis of Plastics Materials
Charging and Operating a Cupola
Trouble Shooting Your Car



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CASTLE FILMS INC.

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MF-3

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Please send me FREE COPY of the NEW 1947 CATALOG describing 730 Motion Pictures and 585 Film Strips.

Name

Street

City & State

Plant Equipment Previews

(*Continued from page 230*)

From 4 to 8 cubic feet of air per minute is all that is required for the complete speed range. In addition to jig grinding applications, it is also produced for adapting lathes, milling machines and grinders for other high speed precision grinding.

MARCH, 1947
PEP 92

NEEDLE VALVE

Selection Board's Opinion: Very small design.

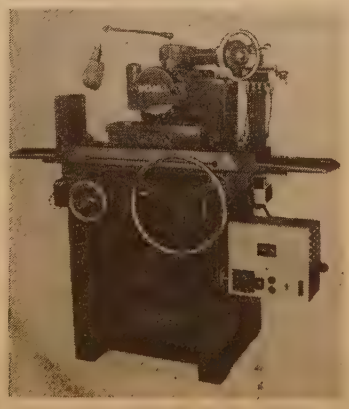
Manufacturer: Kerotest Mfg. Co., Pittsburgh 22, Pa.

Features: Suitable for gage and metering lines, instrument lines, bleeder lines, and other high temperature, high pressure, or corrosive services. The valve combines positive shut-off with micrometer throttling action. Available in both globe and angle types in sizes from 1/8" to 3/4" for working pressures up to 3000 lbs. and temperatures up to 750 deg. F.

MARCH, 1947
PEP 93

HAND OPERATED SURFACE GRINDER

Selection Board's Opinion: Accurate and useful.



Manufacturer: The DoALL Co., 1301 Washington Ave. S., Minneapolis 4, Minn.

Features: Hardened gears running in needle bearings and driven by a 16" properly located hand wheel insure a smooth, easy

(*Continued on page 234*)

KEEP PRODUCTION ROLLING ON BEARINGS FROM L & S

Two-Fold Source of Supply—L & S manufactures radial, thrust, roller bearings, and pillow blocks.—L & S is distributor for other manufacturers.

Write Today — List quantity, number and brands of bearings you need. You will be advised immediately.

We Pay Best Prices For Surplus Bearings

Write Today

L & S BEARING COMPANY
Dept. M-7 P.O. Box 1072
7-5501
OKLAHOMA CITY

BEALL Spring WASHERS

Bolted assemblies stay TIGHT permanently

BEALL SPRING WASHERS, with live, long-range action compensate for ALL causes of looseness including vibration, bolt stretch, wear, rust and break-down of finish under the nut and bolt head.

IN STOCK in all Standard Sizes; made of Carbon Steel, Stainless Steel, Everdur and Duronze.

BEALL TOOL DIVISION (HUBBARD & CO.)
120 Shamrock St. EAST ALTON, ILL.

Greater Strength and Uniformity in Cap Screws—
CLEVELAND Cap Screws—
made by the
KAUFMAN DOUBLE EXTRUSION PROCESS

● Cleveland dependability in threaded fasteners brings you two-fold economy—assurance against breakage, and fast easy handling in assembly. Cleveland Cap Screws are made by the Kaufman Process—the modern cold-forging method that assures you *stronger* fasteners than any other known process. And you can depend on their accurate-to-size heads, shanks and strong smooth-running threads. Cleveland High Carbon Heat Treated Cap Screws are the toughest fasteners in this class. Write the factory or ask your jobber.

CLEVELAND *Top Quality* FASTENERS

The Cleveland Cap Screw Company

2917 EAST 79TH STREET • CLEVELAND 4, OHIO

Ask your jobber for Cleveland Fasteners

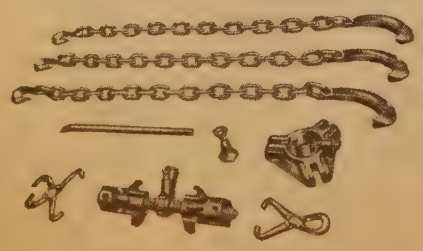
save time and work on countless jobs with

Simplex UTIL-A-TOOL

When you get a Util-A-Tool set on the job, you'll be amazed at the time and labor it saves . . . at the ease with which it enables you to handle otherwise difficult operations . . . at its versatility!

For example, a Util-A-Tool is ideal for clamping and holding parts for welding and assembly . . . moving machinery, straightening frames and structural members. It can be used for pulling in bulged car and truck sides, car doors and other frozen or wedged members; also for pulling machinery or engines on skids, etc. It is a handy beam clamp for chain hoists with the use of sky hooks. It really pulls pinions, bushings, wheels and gears . . . *is the fastest universal wheel puller yet devised!*

THE TOOL OF A THOUSAND USES...



Util-A-Tool sets are available for immediate delivery through distributors everywhere . . . at prices that can easily make this "Tool of a Thousand Uses" pay for itself through time and labor savings on a single job. Write for Bulletin P & P **1016.**

Simplex
LEVER - SCREW - HYDRAULIC
Jacks

TEMPLETON, KENLY & CO.
1016 South Central Ave., Chicago 44, Ill.

Plant Equipment Previews

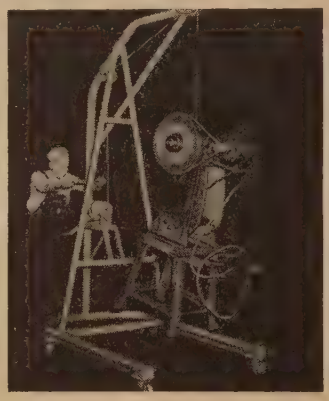
(*Continued from page 232*)

table action. The cartridge type direct drive spindle is standard equipment. Working area of table is 6½" x 19¾" with a maximum work height of 12" using the standard 7" x ½" x 1¼" grinding wheel.

MARCH, 1947
PEP 94

MOBILE HOIST

Selection Board's Opinion: Versatile in materials handling.



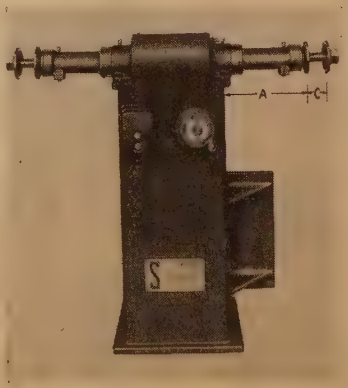
Manufacturer: Almco Inc., 231 E. Clark St., Albert Lea, Minn.

Features: Rated at 1-ton capacity, this hoist is of sturdy welded tubular steel construction. It rolls freely on 4 heavy duty casters fitted with ball bearings. It can be furnished with a hand operated worm-drive winch or with an electric or chain hoist instead. Available both 7' and 9' overall height. The 9' model has a total lift of 8'5".

MARCH, 1947
PEP 95

VARIABLE SPEED BUFFING AND POLISHING MACHINES

Selection Board's Opinion: Versatile line.



Manufacturer: The Standard Electrical Tool Co., 2498 River Road, Cincinnati 4, Ohio.

Features: Come in 9 models ranging from 1 hp to 15 hp. Available both with enclosed spindle construction and exposed or open spindle. Any spindle speed between 1500 and 3000 rpm is instantly available merely by turning the speedial control. Each spindle speed change is recorded on the dial. The drive is properly guarded. A push safety starter gives overload protection.

(*Continued on page 236*)

HERE'S HOW MODERN MECHANICS ATTACK PROBLEMS OF GRINDING HARD-TO-REACH LOCATIONS

● Sterling Stermounts are fully described in this attractive four-page folder. It gives prices and detailed description of every size and shape. Send for it!

WORKMEN smile when they use Sterling's Stermount Wheels and Shapes. Schedules are easy to meet when these efficient aids to production are speeding up grinding.

There is the correct grain, bond, shape, size and structure to make every Stermount you use applicable to the job at hand. A special feature is the detachable spindle which can be used over and over again with several shapes and sizes.

Stermounts do the job without undue pressure and retain their cutting qualities extra long. Their use in your department will speed up production and cut cost . . . a Sterling engineer will gladly tell you how easily it can be done.

• STERLING ABRASIVES •
THE
STERLING GRINDING WHEEL DIVISION
OF THE CLEVELAND QUARRIES COMPANY
TIFFIN, OHIO
THE WHEELS OF INDUSTRY

UP GOES YOUR YARDAGE

DOWN GO YOUR SHOVEL REPLACEMENT COSTS

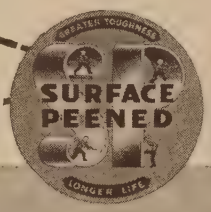
Wherever there's hand shoveling, here's the way to start cutting costs. Equip your men with RAZOR-BACK, the only fully modern shovel with tapered blade thickness and tubular shank — giving you full 13 gauge thickness and strength up the middle, to take the cutting wear and stand the strain, but only 15 gauge over-all weight and better balance to speed the moving of material.

Guarantees you the most shovel service per dollar today, when dollars must be saved for profits.

Send for Catalog, Prices and Distributor's Name

THE UNION FORK & HOE CO.

674 Hocking St., Columbus 15, Ohio



"SURFACE PEENED"—Every shovel "cold-worked" following heat treatment,—tests 2½ to 5 times tougher than fine shovels merely heat treated.

RAZOR-BACK

THE ONLY SHOVEL WITH A BACKBONE

ALSO STONE, BALLAST, INDUSTRIAL FORKS — ASPHALT AND ROAD RAKES

NOW CUT METAL FASTER

Available for Immediate Delivery

with this superbly-balanced, heavy-duty torch!

IT'S NEW . . .
IT'S EASIER HANDLING
IT CUTS PRODUCTION COSTS

Gasweld HC-39 Pacemaker CUTTING TORCH

Recessed tip seat design is proof against roughest treatment. Even dropping this torch on its head can't damage it. Torch head is extra heavy forging.

Here's a torch that fills a big need in heavy-duty cutting. Plenty rugged, the Pacemaker stands lots of use and abuse. An improved *recessed* tip seat safeguards it against blows, or even dropping. Operators welcome the finer heft that cuts "handling fatigue"... *and you profit by stepped-up output.*

Gasweld Torches quickly adjust to the job — metal thicknesses of from ⅛" to 15". Exclusive "Free-Flow" jet design mixer assures superior cutting. Intense flame makes a neater, *narrower* cut. Ribbed brass handle provides a positive grip. Ambrac tubes in triangle assembly contribute to increased rigidity. Forged head adds to strength and long, lasting service. Cut it better, neater, faster with a PACEMAKER!

Get the facts TODAY... Write for full information and catalog of welding and cutting equipment and supplies.

Weil Chemicals Division of

THE LIQUID CARBONIC CORPORATION

3110 South Kedzie Avenue • Chicago 23, Illinois

Plant Equipment Previews

(*Continued from page 234*)

MARCH, 1947
PEP 96

WIRE STRIPPING MACHINE

Selection Board's Opinion: Quick method of stripping.

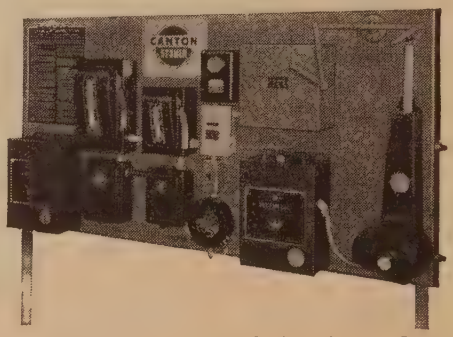
Manufacturer: The Williams Products Co., Middletown, Conn.

Features: Cuts, strips, and slits one, two and three conductor wire up to ½" diameter. It is operated by compressed air. Sixty lbs. air pressure will operate the machine to process most cord. Hardened steel knives are adjustable to the user's specifications. Measurements: 18" wide x 11" deep x 25" high and weighs approximately 75 lbs.

MARCH, 1947
PEP 97

ALL-ELECTRIC COMBUSTION CONTROL SYSTEM

Selection Board's Opinion: All electric feature a recommendation.



Manufacturer: Canton Stoker Corp., Canton, Ohio.

Features: Simplifies the installation technique and reduces installation and operation costs. The variation in Coal Feed on the stoker itself is effected electrically, and in addition one or more stokers can be synchronized electrically at the same time.

MARCH, 1947
PEP 98

SLUDGE CONTACT REACTOR

Selection Board's Opinion: Unit gives greater efficiency.

Manufacturer: Liquid Conditioning Corp., 423 W. 126th St., New York 27, N. Y.

Features: This unit efficiently combines the operations of mixing the raw water with the coagulating chemicals, properly agitating the mixture, maintaining a suspended deep sludge bed or blanket of previously accumulated precipitates, completely separating the clarified water from the sludge. Thus the impurity-saturated sludge is concentrated for minimum volume of blow-off.

MARCH, 1947
PEP 99

LINE REGULATOR

Selection Board's Opinion: Permits accurate control of pressure.

Manufacturer: Dockson Corp., 3839 Wabash Ave., Detroit, Mich.

Features: Can be used in any operation

(*Continued on page 238*)

NEW! "SUPERGRIP" MASONRY DRILLS

HEX SHANK—CARBIDE TIPPED

- **POSITIVE HEX DRIVE**
- **ELIMINATES BREAKAGE DUE *to* FAULTY *or* LOOSE CHUCK *in* POWER TOOL**
- **FAST • ACCURATE • QUIET**

FOR DRILLING
Asphalt • Brick • Concrete • Slate • Marble • Porcelain • Stone • Tile • Wallboard • Plaster • Many Other Materials

SPECIFICATIONS

Stock Number	Diameter Inches	Length Inches	Shank Dia.**
HX-1-A	3/16"	3"	5/32"
HX-2	1/4"	4"	3/16"
HX-3	5/16"	4"	7/32"
HX-4	3/8"	4"	1/4"
HX-4-A	7/16"	6"	5/16"
HX-5	1/2"	6"	3/8"
HX-5-A	9/16"	6"	7/16"
HX-6	5/8"	6"	1/2"
HX-6-A	11/16"	6"	1/2"*
HX-7	3/4"	6"	1/2"*
HX-8	7/8"	6"	1/2"*
HX-9	1"	10"	1/2"*
HX-9-B	1 1/8"	10"	1/2"*
HX-10	1 1/4"	10"	1/2"*
HX-11	1 1/2"	10"	1/2"*

*Shank undercut to 1/2" dia. 2" long.
**Diameter shown is measured across flats.

WRITE TODAY FOR INFORMATION ON THIS PROFIT-MAKING LINE OF CARBIDE TIPPED TOOLS FOR ALL TYPES OF CUTTING JOBS

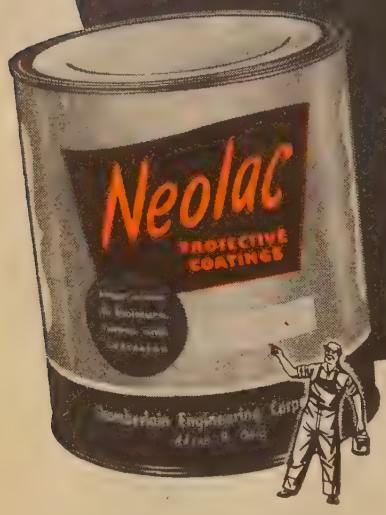
Available at only slightly increased prices.

SUPER TOOL COMPANY

Carbide Tipped Tools

21650 Hoover Road, Detroit 13, Michigan

SPARKLING COLOR
LASTING PROTECTION
IN ONE
Better
Corrosion-Resistant
PLASTIC
COATING



IF YOU'VE hesitated about using color in your maintenance painting program because "color" just can't take the tough corrosive conditions in your plant — try Neolac.

Neolac — the *all* plastic protective coating — is available in a wide range of colors: yellow, red, blue, green, gray, aluminum, interior white, and black.

And — you'll find Neolac a better coating — a different coating. Goes on easy by brush or spray; requires no primer; two coats usually ample; use on metal, concrete or wood; dries in an hour (touch-free in fifteen minutes).

Neolac
PLANTS AND EQUIPMENT for Safety, Sight and Longer Life

RESISTS
Acids • Alkalies
Alcohols • Water

Defies Rust, Age and Corrosion

SPECIAL OFFER
for Comparative Test Purposes
One quart of Neolac (any color) and one pint of Neolac Thinner, both for only $2.80, prepaid anywhere in the U. S. A.

CHAMBERLAIN ENGINEERING CORPORATION
5000 Brimfield Road, Akron 9, Ohio

Plant Equipment Previews

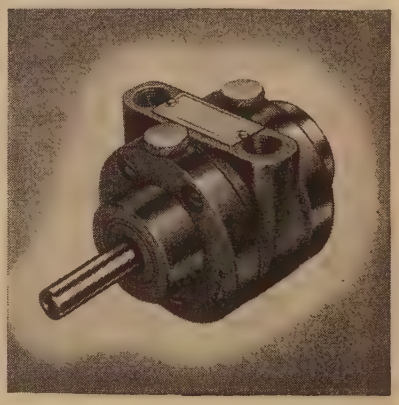
(*Continued from page 236*)

where it is necessary to reduce tank pressure to a range from 1 lb. to 75 lb. with dependable accuracy. Is made of solid forged and bar brass with extra heavy rubber diaphram and positive locking adjusting screw. Has a 1/4" I.P.S. side inlet and may be used with a pressure gage by means of a simple "T".

MARCH, 1947
PEP 100

EXPLOSION-PROOF AIR MOTOR

Selection Board's Opinion: Useful for explosive atmospheres.



Manufacturer: Gast Manufacturing Co., Benton Harbor, Mich.

Features: This 2½ lb., 2¼" diameter motor may be used in place of electric motors on portable or stationary equipment. Motor starts in any position and will not spark, or burn out due to overload or sudden braking. Speed varies from 0 to 6000 RPM; H.P. from 0 to 1/6.

MARCH, 1947
PEP 101

TURBO DRYERS

Selection Board's Opinion: Increased drying efficiency.

Manufacturer: Wyssmont Co., 277 Broadway, New York 7, N. Y.

Features: Two standard models with capacity requirements ranging from 1000 to 10,000 lbs. per day depending on condi-

(*Continued on page 240*)

ASBESTOS IN ACTION

● APAC, used as exterior siding on this huge administration building, combines up-to-the-minute design with maximum durability. Design and Construction by The Austin Company.

Whether your plans include remodeling or new construction, here are 3 compelling reasons why K&M "Century" APAC sheet material is the *right* material to use.

1. APAC IS VERSATILE

Furnished in 4′ x 8′ sheets 3/16″, 1/4″, 3/8″ thick, APAC is easily adaptable to outside sheathing, office panelling, partitions, elevator shaft casings, stock rooms and storage bins . . . in fact APAC has as many uses as a building has surfaces.

2. APAC IS PRACTICAL

Compounded of asbestos and portland cement, APAC is completely fire-resistant, rot-proof, vermin-proof and termite-proof. It makes a neat-looking job and will never deteriorate. Time only toughens it.

3. APAC IS ECONOMICAL

First cost is low, and APAC is so easy to cut, handle and apply that it lowers the cost of construction. Once it's on, APAC lasts indefinitely, without maintenance or protective painting.

• • •

If there's anything else you want to know about this remarkable building board, we'll be glad to give full details. Just call or send us a card.

Nature made Asbestos . . .
Keasbey & Mattison has been making it serve mankind since 1873.

KEASBEY & MATTISON
COMPANY • AMBLER • PENNSYLVANIA

SAVE ON LIGHT PRESSWORK WITH A

famco

FOOT PRESS

● Production line economies are accomplished wherever one, or a whole battery of Famco Foot Presses are used to do light punching and forming jobs. Famco presses eliminate cumbersome, space-consuming equipment that use up electric power. Pictured above is a typical installation of Model 8 S Famco Foot Presses, putting pep into production at Webster Electric Co. of Racine, Wisconsin. Each of the ten sturdy, foot-powered models can be located anywhere . . . they require no wiring, motors or line shafts. Their effortless operation makes them ideal for women employees to attain speed and accuracy, without tiring. Investigate the cost-cutting possibilities of Famco Presses.

OTHER POWERFUL MACHINES THAT NEED NO POWER

Famco Arbor Presses, in 32 models, bench and floor mounting, will deliver up to 15 tons pressure . . . require no electric power.

Famco Foot-Powered Squaring Shears will cut up to 18 gauge mild steel with accuracy and speed. Ruggedly constructed and available in five sizes.

FAMCO MACHINE CO.
1342 18TH ST. • RACINE, WIS.

famco machines

COST CUTTING

• SQUARING SHEARS
ARBOR PRESSES • FOOT PRESSES

Plant Equipment Previews

(*Continued from page 238*)

tions. The 6′ model has 12 shelves; the 8′ has 18. Continuous drying is obtained by repeated transfer and spreading of the material during its travel from top to bottom. The material dries in a uniformly thick layer for a full revolution on each successive tray.

MARCH, 1947
PEP 102

ELECTRONIC TIMER

Selection Board's Opinion: Useful for process timing.

Manufacturer: Photoswitch Inc., 77 Broadway, Cambridge 42, Mass.

Features: An automatic timer for intervals from 1/20th second to 4 minutes. Particularly useful for process control and machine timing when long-life, repeat-cycle operation or precise accuracy is a pre-requisite. Provides 4 basic types of timing: Interval, Delayed Action, Automatic Repeat and Programming. Either 115 V or 230 V. supply line useable.

MARCH, 1947
PEP 103

MICRO MORTAR

Selection Board's Opinion: Long wearing properties.

Manufacturer: Elgin National Watch Co., 107 National, Elgin, Ill.

Features: Could be described as a sapphire mortar and pestle that is not affected by any known chemical at working temperature. It is exceptionally hard, withstanding pressure of 300,000 lbs per sq. inch. Mortar is set in a stainless steel holder 2″ in diameter with ¾″ sapphire bowl. Mortar specifically suitable for the drug and chemical field where purity of material is essential.

MARCH, 1947
PEP 104

BOILER FEEDWATER CONTROL

Selection Board's Opinion: All-electric unit.

Manufacturer: Combustion Control Corp., 77 Broadway, Cambridge 42, Mass.

Features: An automatic control for maintaining desired water level and instantly

(*Continued on page 242*)

He built his own!

THE best and most economical way to acquire modern Jib and Single Girder Bridge Cranes is to buy a 'Budgit' Crane Assembly and complete the crane yourself. Everything, except the beams and shafts, which you obtain locally, to build a crane comes with the assembly.

One man builds the crane in an hour using only a wrench. There's no drilling or machine work to do. There are 'Budgit' Crane Assemblies to build swinging bracket jib cranes and top-running and underhung single girder bridge cranes.

ALL YOU NEED IS

AND A 'BUDGIT' CRANE ASSEMBLY

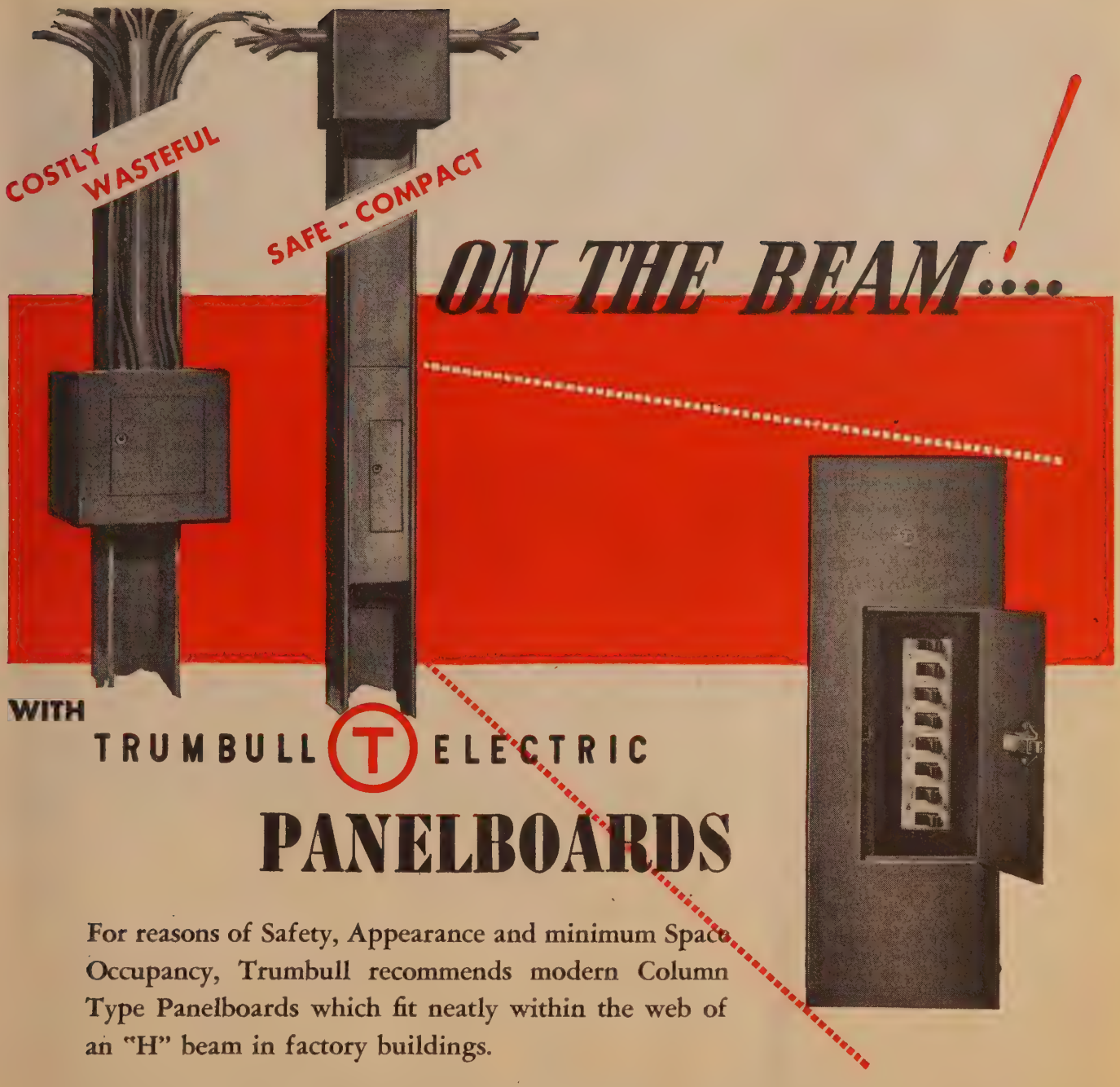
Get complete information about the 'Budgit' Crane Assembly way of acquiring jib and bridge cranes from our distributor in your locality, or write us for Bulletin No. 374.

MANNING MAXWELL & MOORE INC. TRADE MARK

'BUDGIT' *Crane Assemblies*

MANNING, MAXWELL & MOORE, INC.
MUSKEGON, MICHIGAN

Builders of 'Shaw-Box' Cranes, 'Budgit' and 'Load Lifter' Hoists and other lifting specialties. Makers of Ashcroft Gauges, Hancock Valves, Consolidated Safety and Relief Valves and 'American' industrial instruments.



WITH

TRUMBULL ELECTRIC PANELBOARDS

For reasons of Safety, Appearance and minimum Space Occupancy, Trumbull recommends modern Column Type Panelboards which fit neatly within the web of an "H" beam in factory buildings.

The narrow type cabinet is installed at the conventional height with its extension trough carried up the beam nearly to the ceiling. At that point a pull-box is installed, making it unnecessary to carry long main and branch circuit conduit runs to the panel . . . an advantage in wiring time, material costs, and neatness.

For lighting and/or appliance branch circuit protection, Trumbull has standardized Column Type Panels to fit both 8″ and 10″ beams. Type M Multibreaker units provide for a maximum of 42 single pole or 20 double pole branch circuits, ranging from 15 to 50 amperes.

"On the Beam" with Trumbull Column Type is *good* Panelboard installation.

THE TRUMBULL ELECTRIC MANUFACTURING CO.
PLAINVILLE, CONNECTICUT
OTHER FACTORIES AT NORWOOD, OHIO • LOS ANGELES • SAN FRANCISCO • SEATTLE

MAKE ONE BEARING
OUTLIVE TWO!

LUBRIPLATE Lubricants actually condition bearing surfaces and stop progressive wear. They prevent rust and corrosion and resist steam, hot water, many acids and other adverse conditions. LUBRIPLATE is in a class by itself. Use it and make one bearing outlive two. Write or phone for facts and figures.

℞ FOR YOUR MACHINERY

No. 2 — Ideal for general oil type lubrication, ring oiled bearings, wick feeds, sight feeds and bottle oilers.
No. 8 — Because of high film strength and long life it reflects outstanding performance in most types of enclosed gears (speed reducers).
No. 107 — One of the most popular grease type products for general application by pressure gun or cups.
No. 70 — For a wide range of grease applications, especially at temperatures above 200 degrees F.
No. 130-AA — Known nationwide as the superior lubricant for open gears, heavy duty bearings, wire rope, etc.
BALL BEARING — This is the LUBRIPLATE Lubricant that has achieved wide acclaim for use in the general run of ball and roller bearings operating at speeds to 5000 RPM and temperatures up to 300 degrees F.

LUBRIPLATE
FISKE BROTHERS REFINING CO.
NEWARK 5, N. J. TOLEDO 3, OHIO
DEALERS FROM COAST TO COAST
CONSULT YOUR CLASSIFIED TELEPHONE BOOK

Plant Equipment Previews

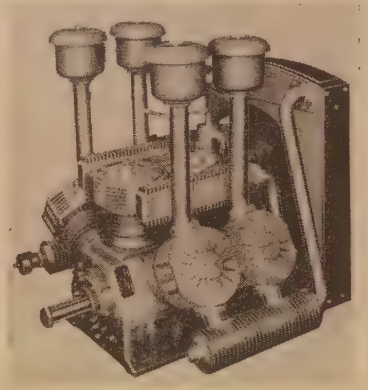
(*Continued from page 240*)

turning off fuel supply and sounding an alarm at a dangerously low-water level. The equipment is completely maintenance free, containing no moving parts, floats, bellow seals or vacuum tubes requiring replacement.

MARCH, 1947
PEP 105

AIR COOLED PORTABLE COMPRESSOR

Selection Board's Opinion: Portability good feature.



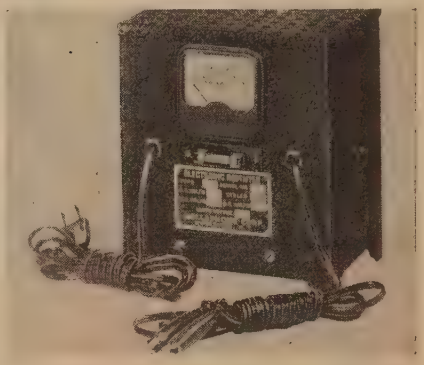
Manufacturer: Davey Compressor Co., Kent, Ohio.

Features: Five models: 60-105-160-210-315 c.f.m. capacity. All units are of V-type cylinder design except the 315 model. The latter is of "W" construction with 4 low pressure and 2 high pressure cylinders.

MARCH, 1947
PEP 106

BATTERY CHARGER

Selection Board's Opinion: Easy to use.



Manufacturer: Mellaphone Corp., 1714 University Ave., Rochester, N. Y.

Features: Operates on 110 volts, 50/60 cycle a-c power. Rated at 8 amps. delivers an initial charge of from 10 to 12 amps on a discharged battery and automatically tapers to approximately 4 amps at full charge. Uses selenium rectifying plates which assure high efficiency and never require replacing.

MARCH, 1947
PEP 107

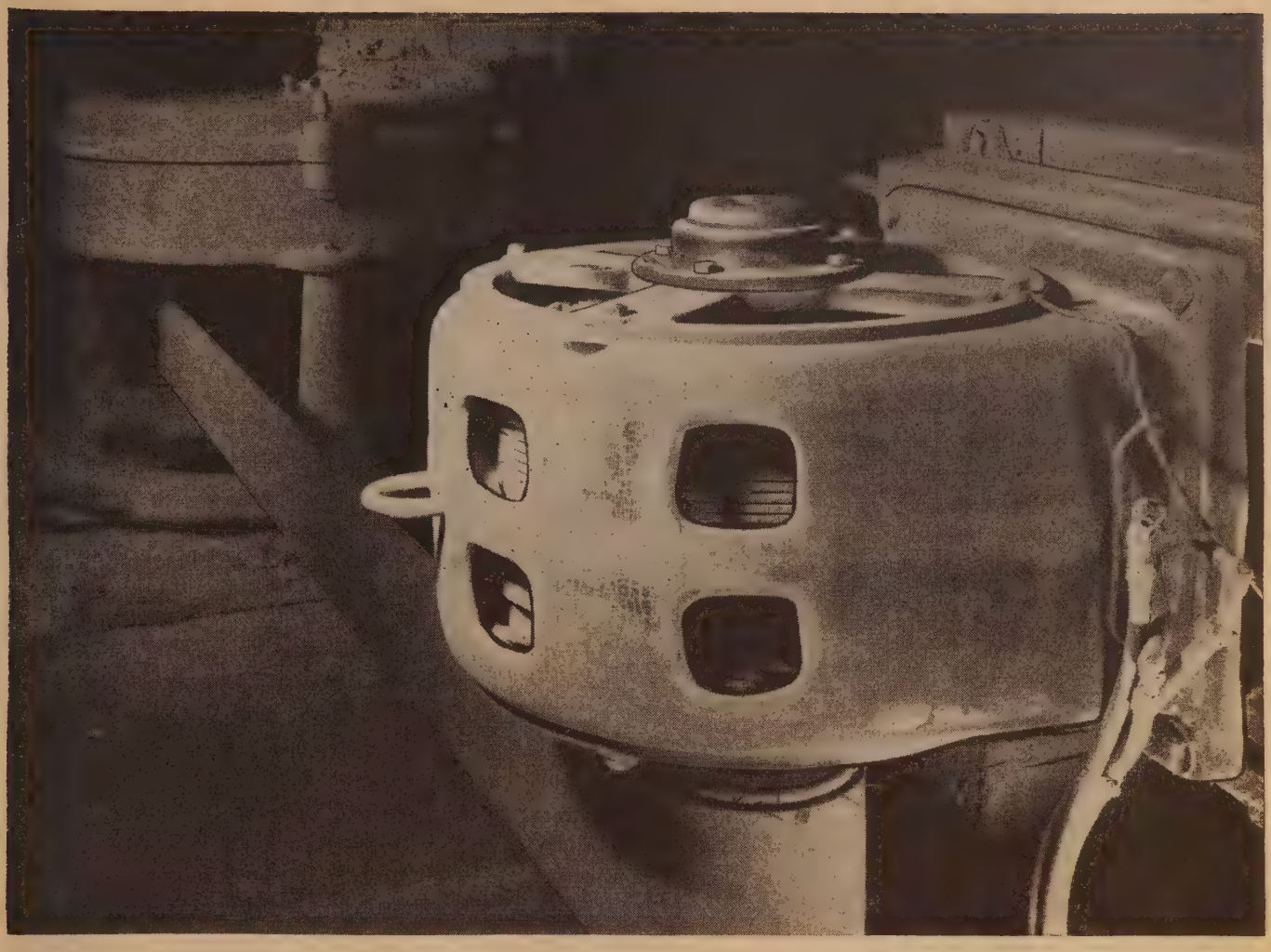
CARBIDE TIPPED BITS

Selection Board's Opinion: Durable.

Manufacturer: S. Gelber Co., 542 West Washington Blvd., Chicago 6, Ill.

Features: Offered in both round and square shanks and in 2 grades (one for cutting steel and one for general purpose work), these bits are for production work where a fine finish is wanted. Shanks are of heat treated alloy steel.

"Here, here, McGonigle—we just asked for your suggestion what to do with that old press."

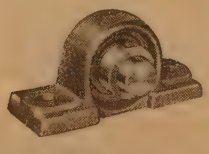


SMALL CHANGE...BIG RETURN

ORIGINALLY, this motor, driving a 48" rock emery mill, was mounted upright because it was running on sleeve bearings. So there had to be a jackshaft, belted to the emery mill. Every six months a new belt was needed at $75 a belt. The jackshaft had to be oiled daily and 225 r.p.m. was the best possible speed.

All it took to mount this motor vertically, kick out the jackshaft and belt the motor direct to the emery mill was a pair of Fafnir Ball Bearing Cartridges and $18 worth of machining. These Fafnir Units have ample thrust as well as radial load capacity. Belts last years instead of months. Production is stepped up by increasing speed to 300 r.p.m. and stepped up quality of product, by running emery mill tighter.

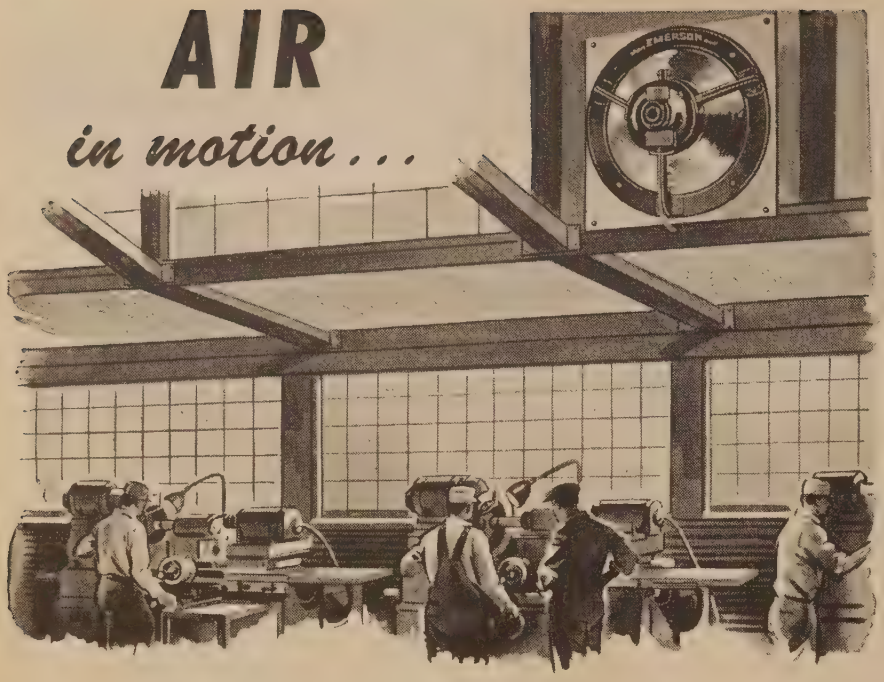
You can get so big a return on so small a change because these motor cartridges, like other Fafnir Ball Bearing Transmission Units, have that exclusive Fafnir feature, the wide inner ring with self-locking collar. The inch-dimension bearing slips onto standard shafts without shouldering or other machining. A twist of the collar engages the eccentric cam on the extended inner ring and a turn of the set-screw locks the bearing securely to the shaft. Ideal for money-saving replacements and for inexpensive new conveyor systems and other in-plant designed power transmission set-ups. You can get the help you need from your nearby Fafnir distributor. The Fafnir Bearing Co., New Britain, Connecticut.



FAFNIR BALL BEARINGS

MOST COMPLETE LINE IN AMERICA

AIR *in motion . . .*



. . . keeps MEN *in motion*

Stagnating production frequently is the result of stagnant air. You'll find daily output of your factory, office or mill benefited when you provide workers with fresh, clean, invigorating air. Moreover, you'll likely find the cost of Emerson-Electric exhaust fans repaid by improved Employee Relations. In the interest of quality production and greater plant harmony, get full information on Emerson-Electric fans at once. Survey your buildings and write direct to us or consult your local Emerson-Electric dealer to suggest the most efficient and economical Emerson-Electric exhaust equipment for your particular air-moving job.

Move up to 16,700 C. F. M. with
EMERSON-ELECTRIC BELT-DRIVE EXHAUST FANS

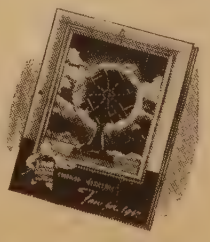
Powered by specially-engineered Emerson-Electric motors, these sturdy fans have an efficient type of blade, rigidly assembled and dynamically balanced to minimize vibration and assure quiet operation. Fan-shaft bearings have lubricating capacity sufficient for 2,000 hours' operation. Made in 48-in., 42-in., and 36-in. sizes.

An EMERSON-ELECTRIC FAN for EVERY Air-moving Job

Emerson-Electric Direct-Drive exhaust fans are available in five sizes from 12 to 30-in., in both ball-bearing and sleeve-bearing types. Motors are fully enclosed. Overlapping-blade assembly insures unusually quiet operation.

Send for **FREE EXHAUST FAN PRODUCTS BULLETIN**

Especially prepared as helpful guide to busy executives interested in plant improvement. Contains full product information, specifications and reference material for plant engineers. Shows typical installations in foundries, machine shops, lofts, show rooms, stores, etc. Send for your copy of catalog No. 424 today.



THE EMERSON ELECTRIC MANUFACTURING CO. • ST. LOUIS 21, MO.
Branches: New York • Chicago • Detroit • Los Angeles • Davenport

EMERSON EMERSON ELECTRIC **ELECTRIC**
MOTORS · FANS APPLIANCES

(Continued from page 160)

• Mill Supply Conference

The 1947 dates of the Triple Mill Conference will be May 11, 12, 13 and 14. The meeting will be at the Traymore hotel, Atlantic City, N. J. Members of the three associations participating are the American Supply & Machinery Manufacturers' Association, Inc., the National Supply and Machinery Distributors' Association, and the Southern Supply and Machinery Distributors' Association.

CALENDAR OF EVENTS

March 6-8. National Association of Foremen. National conference of educational directors in industry; Cleveland, Ohio.

March 17. American Institute of Mining & Metallurgical Engineers. World conference on mineral resources. New York City.

March 17-19. American Society of Lubrication Engineers. Annual meeting; Pittsburgh, Pa.

March 19-22. American Society of Tool Engineers. Annual meeting; Houston, Texas.

March 22. American Society for Metals. Western Metal Conference and Exposition; San Francisco.

March 31-April 2. Midwest Power Conference. Chicago, Ill.

April 7-10. National Assn. of Corrosion Engineers. Convention; Chicago, Ill.

April 8-11. American Management Assn. Packaging exposition; Philadelphia, Pa.

April 28-May 1. American Foundrymen's Assn. 51st Annual Convention; Book-Cadillac & Statler Hotels, Detroit, Mich.

April 29-May 1. Industrial Packaging Engineers Assn. of America. Industrial Packaging & Materials Handling Exposition; Sherman Hotel, Chicago, Ill.

May 5-11. Society of the Plastic Industries, Inc. National Plastics Exposition; Coliseum, Chicago, Ill.

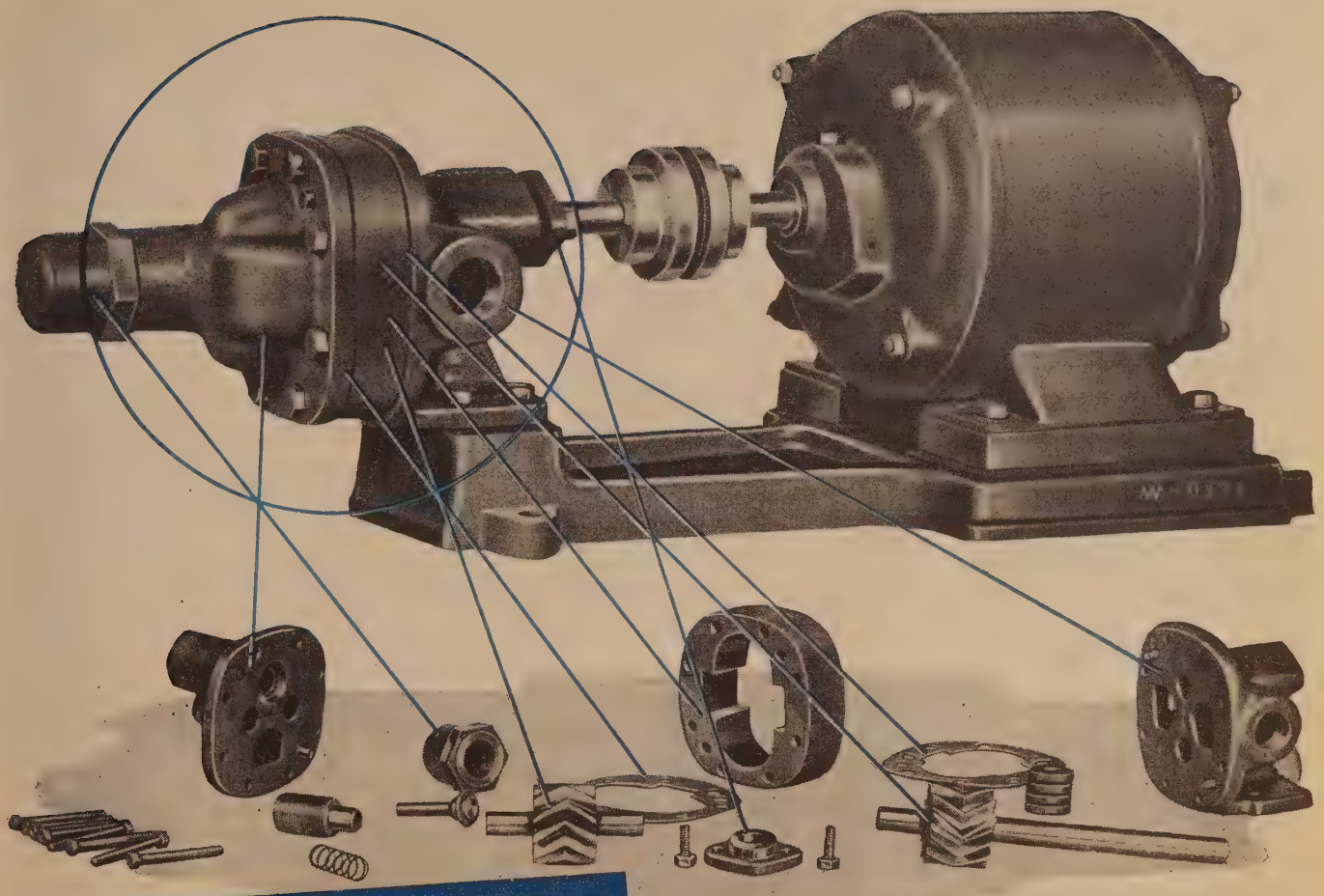
May 11-14. Triple Mill Supply Convention, Traymore Hotel, Atlantic City, N. J.

May 15-17. Society for Experimental Stress Analysis. Annual meeting; Chicago, Ill.

June 16-20. American Society for Testing Materials. Annual meeting; Atlantic City, N. J.

June 17-19. Machinery Dealers' National Assn. Convention; Netherland Plaza Hotel, Cincinnati, Ohio.

(Continued on page 246)



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WORTHINGTON GENERAL SERVICE TYPE GA ROTARY PUMPS *with special herringbone gear rotors*

It's the simplicity of these small-capacity rotary pumps that contains the promise of long, trouble-free service-years ahead. Only a few moving parts; quiet, efficient herringbone gears; four large, pressure-lubricated bearings. That's all there is to this simple design . . . the answer to what, Worthington Market Research discovered, you and men like you in many industries really want.

Subject Worthington GA Rotary Pumps to the test. You will find they will stand up under severe conditions . . . will show little wear when inspection or maintenance time rolls around.

For full specification and application data that prove *there's more worth in Worthington,* ask your nearby Worthington Distributor or Representative for Bulletin W-484-B1 . . . or write direct. *Worthington Pump and Machinery Corporation, Merchandising Division, Harrison, N. J. 36 District Offices throughout the U. S.*

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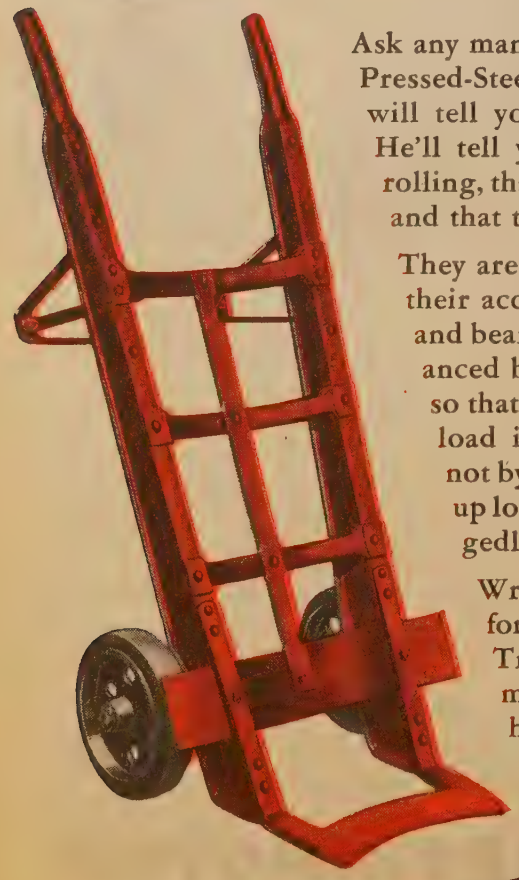
86-44

PRODUCTS BASED ON MARKET RESEARCH

Centrifugal Pumps | Rotary Pumps | Steam & Power Pumps | Liquid Meters | Vertical & Horizontal Compressors | Multi-V-Drives | Variable Speed Drives

1st choice of men who know and use hand trucks



Ask any man who has used American Pressed-Steel Hand Trucks and he will tell you why he prefers them. He'll tell you that they are easier-rolling, that they are better balanced and that they stand up longer.

They are easier-rolling because of their accurately machined wheels and bearings. They are better balanced because they are designed so that most of the weight of the load is carried by the truck—not by the operator. They stand up longer because they are ruggedly built of pressed-steel.

Write today for complete information on American Hand Trucks—the first choice of men who know and use hand trucks.

AMERICAN PRESSED-STEEL HAND TRUCKS

The American Pulley Company

4206 Wissahickon Ave., Philadelphia 29, Pa.

(Continued from page 244)

● Manufacturers & Distributors Meet in Boston

One of a series of regional meetings of mill supply distributors and manufacturers was held at the Copley-Plaza hotel in Boston, January 14. The purpose of these meetings is to conduct clinics which enable the two groups to participate in an overall program designed to stimulate combined thinking on the basic problems of sales management. Phases of this overall program which were taken up at the Boston meeting included the proper selection and proper training of salesmen; training as a continual process; the distributor's sales meeting; market evaluation as a part of sales planning; proper placement of salesmen; proper management support, and better sales promotion.

At the Triple Mill Supply Conference of the distributor and manufacturer associations last May, it was decided to work out a program for rebuilding a sales organization from the group up and to refurbish, resharpen and strengthen the sales effort so that more goods can be sold at lower sales cost.

Among those participating in the Boston clinic were Walter Kemphert, J. J. Simpson, James Tate, Miles Stray, Art Gould, Howard Begg, Jack Proven, Ray Neal, Jim McCullough and Jim Geddes.

An outline of the purpose and value of the market research work done by the American Supply & Machinery Manufacturers' Association as a basis for market evaluation which can be used by both manufacturer and distributor in exploring this subject was presented.

Regional meetings were planned, also, for Memphis and Cleveland in February, and one is scheduled for Philadelphia late this month.

● NEWA Convention Theme

Opportunities for distribution in "The Coming Electrical Age" will be the theme of the 38th annual convention of the National Electrical Wholesalers Association in May, according to an announcement by managing director Charles G. Pyle. Two special afternoon programs are being planned, one under the sponsorship of the Appliance Division, with chairman E. B. Ingraham presiding, and the other by the Apparatus and Supplies Division of which D. M. Salsbury is chairman.

George E. Whitwell, vice president, Philadelphia Electric Co., will

(Continued on page 248)

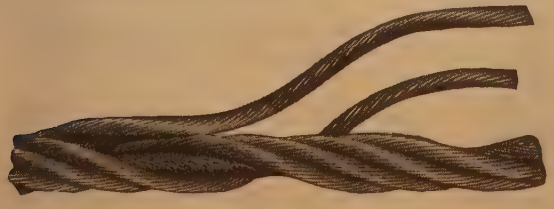
Where does Form-Set Rope (PREFORMED) do a better job?

A good question—one we're often asked. Generally speaking, it does a better job wherever operating ropes pass around small sheaves and wind on small drums. Or where reverse bends are necessary. Or in other situations where added flexibility is a definite asset.

All grades, sizes, and types of Bethlehem wire rope can be furnished with the Form-Set (preformed) construction. We recommend preformed rope whenever extra performance thoroughly justifies its installation.

By extra performance we mean less kinking, better spooling, better reeving, and greater resistance to bending fatigue. The latter is especially important where running ropes must bend sharply, for preformed rope is free of pent-up internal stresses. It is "relaxed"; it does not fight itself to death.

Form-Set rope is as easily handled as a gentle, friendly dog. Yet it's tough, too—and it l-a-s-t-s.



Section of Form-Set (preformed) rope. The displaced strands shown here have been lifted out by hand; they cannot pop loose by themselves, even when cut or broken

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.
On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation

When you think WIRE ROPE . . . think BETHLEHEM

The LOAD SEEMS Lighter!
Yes, sir—the load really seems lighter when it's carried in one of these easy-wheeling Sterling barrows. For these sturdy Sterlings are equipped with smooth-running anti-friction bearings. Scientifically designed . . . well-balanced . . . actually 80% of the load is carried by the wheel; only 20% by the operator. While deliveries are still retarded, due to the material situation, we'll make every effort to serve you as soon as conditions permit.
STERLING WHEELBARROW CO., Milwaukee 14, Wis.
Look for this Mark of STERLING Quality
Sterling
WHEELBARROWS
A 5096-1⅛

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ARRO - SPIN DRILL
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FOR MASONRY—with Genuine CARBOLOY TIPS
Arro-Spin drills in ROTARY electric portable drills end noisy, monotonous chiseling.
Drills 4 times faster—the fastest cutting drill ever introduced.
Lasts up to 50 times longer—the longest-wearing drill you've ever used.
Smooth, quiet cutting of concrete, brick, marble, tile, slate, limestone, etc.
Available in sizes from 3-16" to 1½" diameter.
Drills clean holes for proper fits of expansion shields, anchors, toggle bolts, etc.
ARRO EXPANSION BOLT COMPANY • MARION, OHIO
Other ARRO Products
Sold only through jobbers

(Continued from page 246)

be the keynote speaker at the former meeting on the afternoon of May 5. On May 7, at the latter group's meeting, R. Stafford Edwards, president, Edwards and Co., and president of the National Electrical Manufacturers Association, will speak on the "Go All-Electric" program.

Other program features being planned for these special sessions are to include several dramatic skits and motion pictures on personnel selection, basic sales training, rural markets, lighting and adequate wiring. Details are to be announced later.

Herbert Metz, chairman of the NEWA planning committee, will speak on electrical interdependence.

Officers and members of the new board of governors (formerly the executive committee) will be elected during the convention. Meetings of committees of both divisions have been scheduled, as well as committee reports.

The convention will be held at Atlantic City, May 4-8, with headquarters at the Hotel Traymore. It is expected that more than 1,000 members and guests will attend.

• ASTE Houston Meeting

Headquarters for the 1947 annual convention of the American Society of Tool Engineers to be held March 19-22 at Houston, Texas, will be at the Rice hotel.

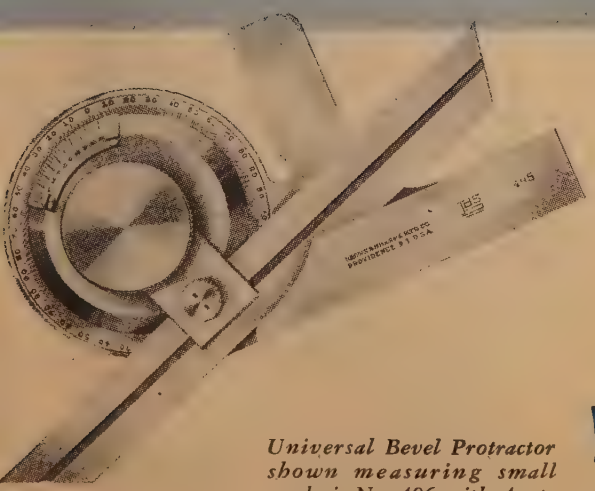
This is a portion of the business section of Houston, the convention city.

An attendance of 2500 tool engineers is anticipated. The semi-annual meeting scheduled for Pittsburgh last October was cancelled because of strikes in the Pittsburgh area.

Main feature of the social activities for the 4-day meeting will be Texas Day on March 22 which

(Continued on page 250)

TOOLS THAT EARN THE TRUST *of skilled machinists*



Universal Bevel Protractor shown measuring small angle is No. 496 with Acute Angle Attachment. Immediately above is No. 495.

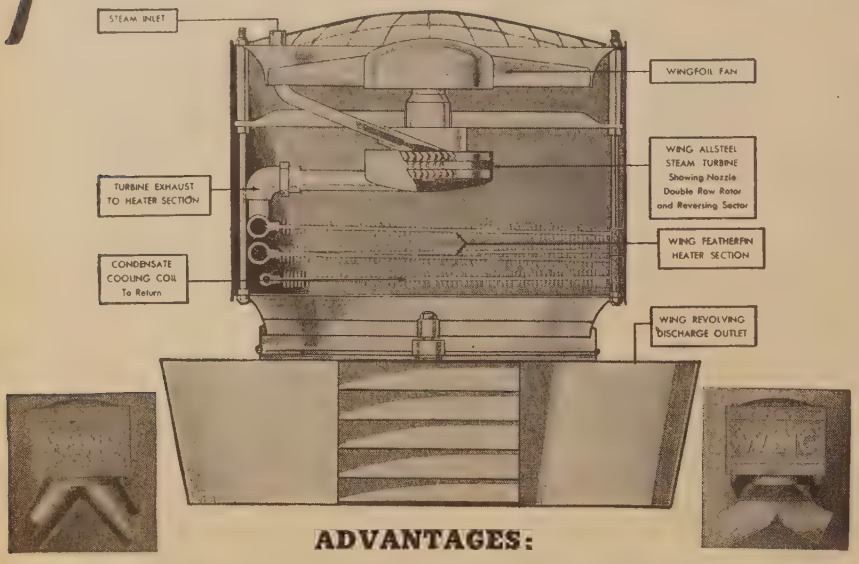
We urge buying through the Distributor

WHEN A MACHINIST lays out or establishes an angle with a Brown & Sharpe Bevel Protractor he has complete trust in the accuracy of a fine tool. That trust, whether inherited from an older craftsman, acquired from everyday use or even from apprenticeship days, has been earned by the superior performance of Brown & Sharpe Tools—by excellence of design and workmanship. This trust is an intangible quality that adds a very tangible extra value to the tools themselves—that makes each purchase of Brown & Sharpe Tools a satisfying, wise investment. Brown & Sharpe Mfg. Co., Providence 1, R. I., U. S. A.

BROWN & SHARPE TOOLS

Another WING "First"!

the Wing Turbine Revolving Unit Heater


STEAM INLET
WINGFOIL FAN
WING ALLSTEEL STEAM TURBINE Showing Nozzle Double Row Rotor and Reversing Sector
TURBINE EXHAUST TO HEATER SECTION
WING FEATHERFIN HEATER SECTION
CONDENSATE COOLING COIL To Return
WING REVOLVING DISCHARGE OUTLET

ADVANTAGES:

- **No electric motor**
- **Source of heat is also source of power**
- **No back pressure**
- **No packing**
- **No traps**
- **No pressurestat needed. Fan stops when steam pressure stops**

This new product is the logical result of constant improvements in two specialized lines of equipment pioneered by L. J. Wing Mfg. Co.

The first Wing turbine was built as an integral part of the Wing forced draft blower 40 years ago. The first lightweight-suspended downward-discharge unit heater was introduced by Wing 25 years ago. The patented revolving discharge outlet was introduced in 1935. The Wing Turbine Driven Revolving Unit Heater, now offered, combines all three.

Powered by the new Wing Allsteel Steam Turbine which operates at *any* pressure, the steam which propels the fan is exhausted into the heater section and used to heat the air—thus eliminating motor and electric power.

There is no back pressure on the turbine, eliminating the need of power-absorbing, troublesome packing. No steam traps are used.

The Revolving Discharge Outlets distribute the heat continuously in constantly changing directions, over, around and under obstructions, into out-of-the-way corners.

Write for Bulletin

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Wing

TURBINE BLOWERS

MOTOR DRIVEN BLOWERS

REVOLVING UNIT HEATERS

UTILITY UNIT HEATERS

STEAM TURBINES

FOG ELIMINATORS

VENTILATING FANS

DUCT FANS

SHIP VENTILATORS

(Continued from page 248)

will be highlighted by an old fashioned barbecue and a rodeo. Tours of industries in the Houston area, and sightseeing tours of south

A. M. Sargent, ASTE President.

Texas will be on the program along with outstanding technical sessions, committee meetings, showings of carefully selected technical motion pictures, and general meetings.

Jesse H. Jones, former head of the Reconstruction Finance Corp., and resident of Houston, will be guest of honor at the Texas Day celebration.

● AFL Plan to Curb Strikes

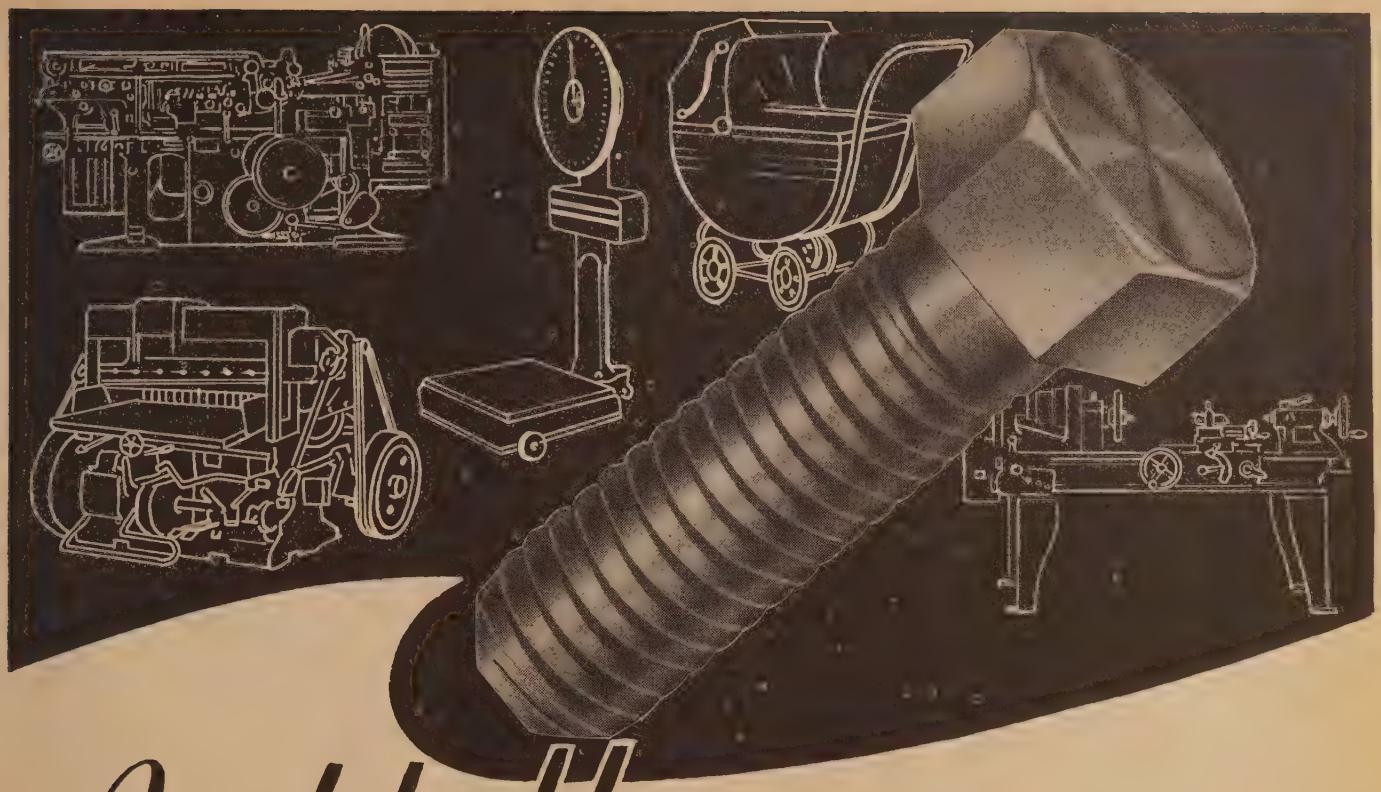
A plan to set up arbitration tribunals in AFL unions along lines announced by President Truman for the building and construction industry was adopted by the American Federation of Labor Executive Council at its meeting in Miami, Fla., in February. The system of arbitration tribunals would be adopted to cut down on the number of strikes. It was proposed at the AFL convention last October by the Screen Actors Guild because of the intermittent jurisdictional strikes in Hollywood, but the AFL council moved that the plan be set up for all of its unions.

● Union Warns Members

Members of the International Brotherhood of Teamsters, AFL, have been warned by officials of the union that unauthorized strikes will be met with stern disciplinary actions. At a meeting of the executive board recently in Florida, the board went on record as threatening to suspend local unions and their officers who are responsible for wildcat strikes.

An example of the action which will be taken was shown in St. Louis where six members were brought to trial by the union be-

(Continued on page 254)



Justifiably Famous FERRY Shinyheads

To enhance the value of your product—specify *justifiably famous* Shinyheads. They give that finishing touch, that extra sales appeal, along with extra quality.

Shinyheads are hexagon head cap screws—*Full Finished*—of high carbon C-1038 steel, with bright, shiny heads—completely machined top and bottom . . . bearing surface washer faced. Top of head chamfered . . . sides parallel and smooth, mirror finish. Threads uniform and accurate to close tolerance dimensions for perfect fit to standard gauges.

Special Note—Very Important—In addition, Ferry Cap SHINYHEADS include *all points machine turned and chamfered.*

The FERRY CAP & SET SCREW Co.

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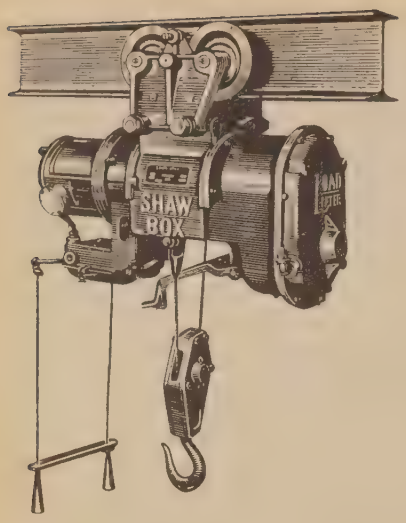
Pioneers and Recognized Specialists Cold Upset Screw Products since 1907

CAP AND SET SCREWS • CONNECTING ROD BOLTS • MAIN BEARING BOLTS • SPRING BOLTS AND SHACKLE BOLTS • HARDENED AND GROUND BOLTS
SPECIAL ALLOY STEEL SCREWS • VALVE TAPPET ADJUSTING SCREWS • AIRCRAFT ENGINE STUDS • ALLOY STEEL AND COMMERCIAL STUDS • FERRY PATENTED ACORN NUTS



Install this Hoist!

For handling heavy loads—loads up to 40,000 pounds in localized areas, install 'Load Lifter' Electric Hoists! They come in such a wide variety of sizes, combinations, and speeds, you will find the hoist you seek a standard one in the line.

'Load Lifter' Electric Hoists are simple rugged hoists built to perform the hardest lifting jobs with minimum attention.

The exclusive advantages such as 'one point' oiling system, two gear reduction drive, 'fool-proof' upper stop, and others found only in them, contribute much to the outstanding performance they give.

List of sizes, advantages and construction details of 'Load Lifter' Electric Hoists are graphically displayed in Catalog No. 215. Send for it today.

'Load-Lifter' Electric Hoists are built with lifting capacities of 500 to 40,000 lbs., in all combinations required for industrial needs. They are adaptable to almost every working condition within their capacities. Write for Catalog No. 215.

MAXWELL MANNING MOORE INC. TRADE MARK

'LOAD LIFTER' *Hoists*

MANNING, MAXWELL & MOORE, INC.
MUSKEGON, MICHIGAN

Builders of 'Shaw-Box' Cranes, 'Budgit' and 'Load Lifter' Hoists and other lifting specialties. Makers of Ashcroft Gauges, Hancock Valves, Consolidated Safety and Relief Valves and 'American' industrial instruments.

(Continued from page 250)

cause of an unauthorized strike. After the group was convicted, the St. Louis group called a retaliatory strike and 39 more members were brought to trial. Six were expelled and 25 were put on five years' probation.

The resolution stated that the international union would not tolerate violation of its constitution and that local unions and officers responsible for such violations would be disciplined.

The resolution stressed that restrictive anti-labor laws have resulted and may further result from calling strikes which are detrimental to labor generally.

• Cases Await NLRB

The number of cases awaiting action by the National Labor Relations Board, as reported last month, was 5065. An increase of 37% over the number of cases pending a year ago was reported. In December, 1946, the board received 962 petitions for bargaining elections and complaints of unfair labor practices, thus increasing the total to 5065.

• Apprenticeship Programs

The year 1946 saw an increase over 1945 of 10,756 apprenticeship programs throughout American industry—from 5,818 to an all-time high of 16,574, or nearly three times the number at the end of 1945. During 1946 there was a gain of 48,125 more establishments participating in programs — from 30,628 to 78,753, or more than 2½ times the 1945 figure. In the construction industry, there was an increase of 2,736 apprenticeship programs — from 1,118 to 3,854 or 245%. Over 44,940 construction contractors—more than double the number in December of 1945—are now participating in programs.

This increase in apprenticeship programs was announced by William F. Patterson, director of Apprentice-Training Service, U. S. Department of Labor.

There are today 14,313 more construction establishments taking part in apprenticeship programs than the total number of all participating establishments in all industries at the end of 1945. Over 96% of all the 44,940 construction establishments are participating in area-wide programs. These programs are conducted by local joint contractor-labor committees. Since

(Continued on page 256)

For Economy Use

Sheps NEATSLENE STICK BELT DRESSING

Contains Mutton Tallow
Made in Stick and Liquid

Sheps
NEATSFOOT OILS

Made in Three Grades
PURE—PRIME—NO. 1
Sheps Neatsfoot Oils and Sheps Neatslene Harness Oils.
Best for leather in all kinds of weather.
Softens—Preserves All Leather

From the foot bones of beef animals processed in Omaha Packing Houses comes the Pure Neatsfoot Oil used in Sheps Neatfoot Oils.

See your Mill Supply Dealer or WRITE US for name of nearest dealer.

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ROY W. SHEPARD "SHEP"

How to discover and eliminate causes of bad work . . . through the use of

CONTROL CHARTS IN FACTORY MANAGEMENT

By W. B. RICE,
Consulting Business Statistician

This book was written to promote theoretical and practical understanding of one of the most useful tools of factory management—control charts. Major emphasis is placed on practical applications, especially in case histories. The philosophy of statistical control is also stressed, since the value of control chart applications depends on an understanding of the theory. The author shows how control chart technique can help build economical quality into a product and find those faults and errors that are controllable but not controlled.

1947 149 Pages
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Please send me a copy of Rice's CONTROL CHARTS IN FACTORY MANAGEMENT on ten days' approval. If I desire to keep the book, I will remit $2.50 plus postage; otherwise I will return the book postpaid.
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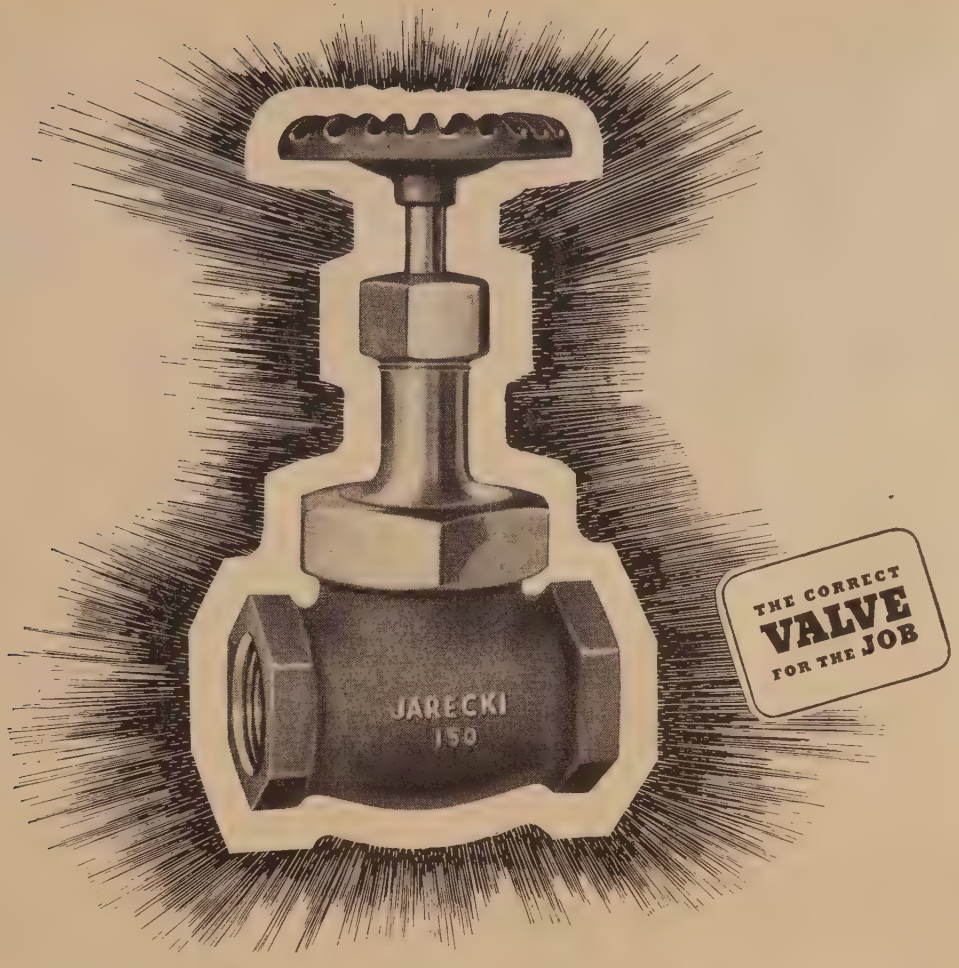
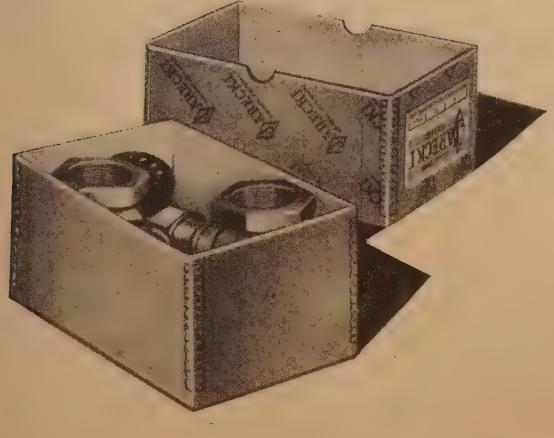


From The Complete Jarecki Line



SHOWN above is Jarecki Fig. 453 Bronze Globe Valve . . . Union Bonnet . . . Renewable Composition Disc . . . Sizes ¼ inch to 2 inches inclusive. Angle Valves . . . Horizontal Check Valves, of course!

Your Jarecki distributor will supply you from the complete Jarecki line.

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Since 1852

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Valves and Fittings

STASAFE

ALL PLASTIC

EYE MASK

- SAFETY
- LIGHTWEIGHT
- PERFECT FIT
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- SNAP-IN-LENS

Want maximum protection and comfort, even after hours of constant wear? This revolutionary new safety goggle weighs only 1¾ ounces, has wide-vision, impact-resistant, optically-perfect lenses for full eye zone protection without glare or distortion. See for yourself how the all-plastic StaSafe Eye Mask offers you the finest in extra confidence, extra comfort and extra protection . . . at lower cost per unit.

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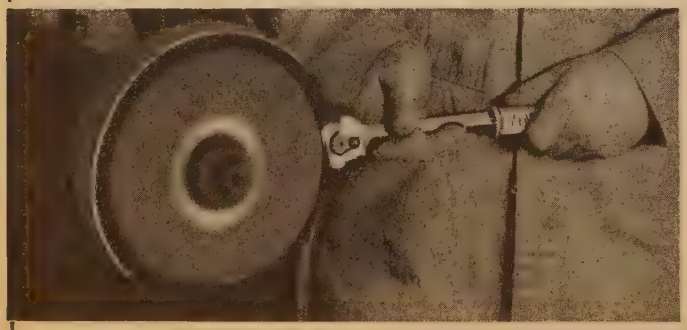
MORE PRODUCTION PER WHEEL DRESSING



with

VINCENT-HUNTINGTON GRINDING WHEEL DRESSERS *and* CUTTERS

The cleaner—more accurately a grinding wheel is dressed, the less frequently the operation is necessary.

Vincent-Huntington Grinding Wheel Dresser Cutters—made of special steel and heat-treated to an exact hardness by an exclusive Vincent process—wear longer and do not break or mush-over on the toughest hand dressing and truing applications, thus producing a cleaner, more accurate grinding wheel surface. The result—*more production per wheel dressing . . . more dressings per dresser cutter.*

Complete stocks, in styles and sizes to cover your every hand dressing and truing need, carried at your mill supply house.

Vincent STEEL PROCESS COMPANY
2424 BELLEVUE AVE. · DETROIT 7, MICHIGAN

(Continued from page 254)

1945 there has been a 90% increase in the number of these committees in the building trades—from 1,120 to 2,131. Each committee is in charge of an area-wide program in which contractors throughout the area are taking part.

In the manufacturing and other industries there has been an increase of 25,055 companies participating in programs. A large percentage of these companies are participating in area-wide programs, while the balance have independent programs under which only the apprentices in their own plants are trained.

In commenting on the gain in apprenticeship programs, Mr. Patterson said:

"The upswing in apprenticeship activities is very gratifying, especially in the building trades where it has been so essential to develop skilled workers to carry out the emergency housing program and other sorely needed construction projects. Since the war, every industry has had an enormous reconversion job to meet peacetime demands, and one of the major tasks has been to overcome the shortage of skilled men. During the war, apprentice-training was seriously retarded, due largely to the dearth of young men not in uniform, qualified for this training. Today we have the returning veterans to draw upon, and our industries are now making up for lost time. Fully 85% of the apprentices currently employed are veterans.

"The rapid expansion in apprenticeship programs has been due to the getting together of management and labor in setting up programs. During 1947 I look forward to continued growth in the number of establishments taking part in apprenticeship programs, and to improvements in programs that have been set up."

● IDA Has Meeting

The convention of the Industrial Diamond Association of America, at the Claridge Hotel, Atlantic City, January 27, 28 and 29, featured efforts to adapt industrial diamond tools to industry still further, to assist industry in the conservation and proper use of diamond, and to publicize those efforts.

The general meetings were under the chairmanship of I.D.A.'s president, Harvey B. Wallace, re-elected for 1947, who is also president of the Wheel Trueing Tool Co., De-

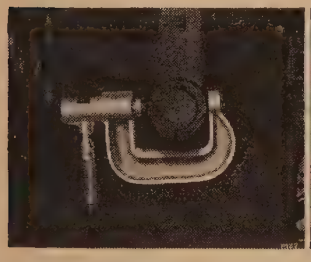
(Continued on page 258)

Porto-Power* is a Complete System of Portable Hydraulic Power for EVERY PLANT

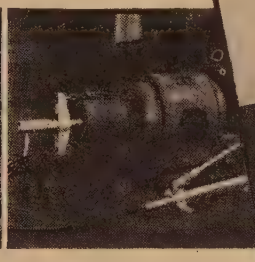
THE unmatched array of Porto-Power equipment serves every department of your plant — handles 1001 maintenance and production jobs. Myriads of units and attachments — in 2, 4, 7, 10, 20, and 50-ton capacities give Porto-Power an exclusive versatility and profit-making ability unapproached by any other equipment. Compact, powerful, portable —one man can carry it to the job.

COMPACT quarters and need for moderate force require Bantam. Above—Loosening stoker ram.

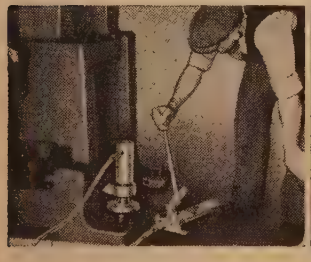
MACHINERY is lifted by the 4-ton midget ram, low height of 1⅜".



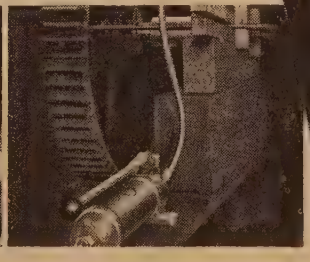
MAINTENANCE — The 7-ton short ram pushes pins, etc. in tight spots.



PULLING—10-ton Porto-Power pulls without loss of power.



TOE on 20-ton ram lifts 10 tons from 3½" low.



PULL heavy gears — using steel pullbars.

RIGID 1"-2" PIPE is range of model S-30A.

RIGID 1¼"-4" PIPE — handled by model S-36.

YOUR GUIDE TO FASTER, BETTER WORK! This new Blackhawk catalog gives you the complete story on Porto-Power. It contains information on the entire Porto-Power line including sensational new Postwar developments. And in addition it is chuck-full of tips and suggestions on extra uses for your Porto-Power that create big extra savings and safety measures for you. Write today for your copy of this Blackhawk Porto-Power Catalog. Order Porto-Power from your Industrial Supply Distributor.

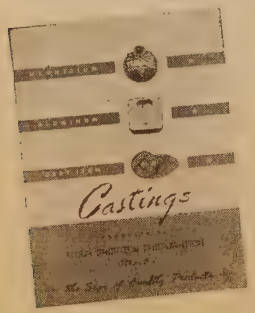
**There is only one Porto-Power . . . it is made by Blackhawk. Trademark Registered.*

BLACKHAWK MFG. COMPANY, Dept. P1637 **Milwaukee 1, Wis.**

Magnesium offers lightness and strength at equal or less cost . . .

Excellent machining qualities often make magnesium castings cost less than those of the more common metals, even though the original cost of magnesium may be slightly higher. So if your product requires high strength, light weight, resistance to shock, and good machinability—investigate magnesium! It may solve your problems at equal or less cost! Our design engineers and metallurgists will be glad to discuss your specific problems.

SEND FOR THIS INTERESTING FOLDER



We have prepared an informative story on our production facilities, and shall be pleased to send you a copy upon request.

UTICA RADIATOR CORPORATION
UTICA 2, N.Y.
Manufacturers of
MAGNESIUM, ALUMINUM, GRAY IRON CASTINGS

(Continued from page 256)

troit. There were also talks by 1946 first vice-president, I. J. Meade, and vice-president Charles J. Koebel, president of the Koebel Diamond Tool Co., Detroit, elected 1st Vice-President for 1947. Other Directors are Fernand Durand, Cochaud Wire Die Corp., New York; Frank Koebel, J. K. Smit & Sons, Inc., New York; Harold DeS Mendes, Mendes Diamond Sales Co., New York; James A. Ross, Sprague & Henwood, Inc., Scranton, Pa.; H. R. Spandel, New York; Charles Ullmann, Associated Diamond Co., New York; Stephen Hofman, New York, and I. J. Meade, U. S. Industrial Diamond Corp., New York.

Ray H. Morris of the American Society of Tool Engineers addressed the opening session of the annual meetings, with a speech on the advantages of trade associations for the improvement of products and the improvement of industrial relations. A paper on the need for technological research in diamonds was prepared in London for this convention by the engineer, P. Grodzinski. In his paper the author stressed the necessity for surmounting, through research, a final hurdle — the direct application of diamond tools to steel.

An important phase of the work of the public relations, the research, and the toolmakers committees is in the preparation of the forthcoming I.D.A. Manual on the use and care of diamond tools. This will be published in installments in "Metal Cutting Data" of the American Society of Mechanical Engineers, prior to printing as a manual.

A development of interest to all mechanized industries as well as to industrial diamond groups, was the report of the diamond power subcommittee, headed by Frank Koebel. Most of the members of this committee are on the national permanent committee of the Bureau of Standards for diamond power and they have recommended a new standard classification.

• C. G. M. A. Meets

Charles G. Andrew, operating and engineering executive of the Air Reduction Co., Inc., was elected president of the Compressed Gas Manufacturers' Association at that group's annual meeting held in New York in January.

In addition to Mr. Andrew, other officers elected were: L. W. Hench of the American Oxygen Service Co. first vice president; Edmund Rowland of the Henry Bower Chemical Mfg. Co., second vice president, and F. R. Featherston, secretary-treasurer.

The remainder of the two-day session was devoted to the presenta-

(Continued on page 260)

"Don't move—I'm going to borrow your micrometer a minute."

HALLOWELL

MEMO

TO: Maintenance Managers, Shop Foremen, Purchasing Agents

FROM: Management

SUBJECT: "Hallowell" Shop Equipment of Steel

Be sure to order "Hallowell" Shop Equipment of Steel. We are convinced that this sturdily built, all-steel equipment is what we need. It has welded and hydraulically riveted joints — which means it will never wobble or fall apart. The "Hallowell" Work Benches of Steel come in five heights and seven lengths — and so they can be arranged to any length or height we need. The stools come in heights from 18" to 30" — this will provide the right height stool for each worker.

And don't forget the "Hallowell" Tool Stands of Steel — or the "Hallowell" Trucks of Steel with those free-rolling casters.

Make our shop the most modern, efficient and up-to-date shop in town, with "Hallowell" Shop Equipment of Steel.

"Unbrako" and "Hallowell" Products are sold entirely through distributors.

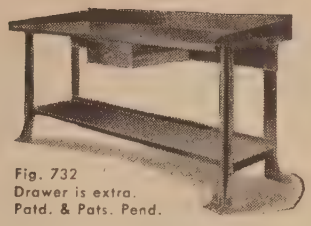


Fig. 732
Drawer is extra.
Patd. & Pats. Pend.

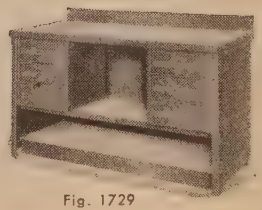


Fig. 1729

Fig. 1334

Fig. 1249

Fig. 2207

Fig 769
Pat. Applied for.

HALLOWELL

Over 43 Years in Business

STANDARD PRESSED STEEL CO.

JENKINTOWN, PENNA., BOX 920 • BRANCHES: BOSTON • CHICAGO • DETROIT • INDIANAPOLIS • ST. LOUIS • SAN FRANCISCO

Big order—these days of carton shortages—but it got filled! Whatever your packaging headache, you'll enjoy the story:

REYNOLDS METALS' "Pasadena" is a handsome table-and-chair set. The packaging problem was to conserve materials and shipping space—through use of a small-sized carton—yet preserve the polished Reynolds Lifetime Aluminum tubing legs from scratches during shipment. The carton contractor called in a Bauer & Black Technical Consultant. Here was his

SOLUTION: The legs of the dismounted table were wrapped in paper and laid parallel to the plywood top. The legs and the cross-member (at bottom) were held together firmly with Bauer & Black Industrial Adhesive Tape No. 270—a cloth tape with great tensile strength. The small carton was now a perfect fit, and 5000 tables were delivered *scratch-free*, at a considerable saving. For No. 270 prevented shifting movement—the cause of scratches and mars.

TAPE MAY MEAN MONEY FOR YOU

Whether your problem is packaging—or weather-proofing, insulation, incorporation of tape into products—or bundling and protection, a Technical Consultant will be glad to help you with it, free. Write Dept. 103 today.

Products of

BAUER & BLACK

Division of The Kendall Company, 2500 S. Dearborn St., Chicago 16

Industrial Adhesive Tape

PRESSURE SENSITIVE

Production Short Cuts to Reduce Costs • Research to Speed and Improve Methods

(Continued from page 258)

tion of technical papers and discussions of committee reports on the manufacture and handling of compressed and industrial gases.

Luncheon speakers for the two days were I. Austin Kelly, of the National Employe Relations Institute, who spoke on the topic of employer-employe relations and Dr. John R. Dunning, Department of Physics, Columbia University, who spoke on the future of atomic energy.

• Sieger Heads RWMA

George N. Sieger, president of S-M-S Corp., Detroit, Mich., was elected president of the Resistance Welder Manufacturers Association at the group's annual meeting at the Book Cadillac Hotel in Detroit in January. For the past two years Mr. Sieger has been active in the expansive publicity and promotion work in which RWMA has engaged, serving as chairman of the committee on publicity and public relations. Under his direction the association's *Resistance Welding Manual* has been extensively revised and enlarged and his committee has engaged in considerable educational and promotional work to bring to public attention the great strides made by resistance welding during and since the war.

Mr. Sieger has, for a number of years, been active on committees of the American Welding Society and now serves as second vice president of that organization.

T. S. Long, vice president and general manager of the Taylor-Winfield Corp., Warren, Ohio, was elected as vice president of RWMA. He has been active in the association's work for several years and served during 1946 as chairman of the arbitration committee.

• Domestic Truck Bookings

Domestic bookings for electric industrial trucks and tractors during the month of November, 1946, totalled 293 units, figures released by the Electric Industrial Truck Association, 208 South LaSalle Street, Chicago, Ill., indicate.

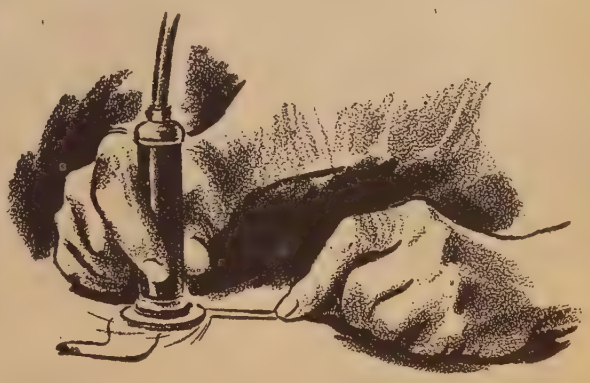
The net value of chasses only booked during November totalled $1,297,006.91 compared with $1,219,469.42 in October 1946.

The November bookings included six platform trucks with capacities of 3000# to 10,000#, and chassis base prices ranging from $2175 to $4335, respectively, had a total net value of $21,205; 247 cantilever

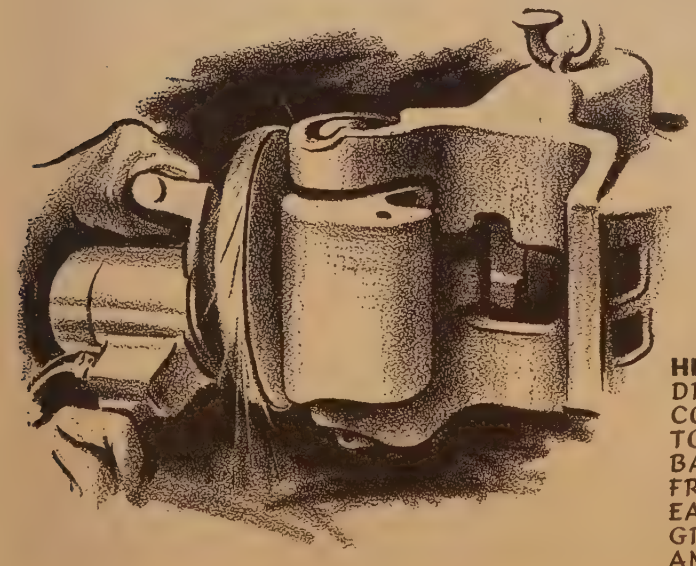
(Continued on page 262)

Abrasives for BAR POLISHING

THE CHANCES ARE THAT SPECIALLY-PROCESSED JEWEL NATURAL GARNET WAS THE "SANDING" MEDIUM THAT BROUGHT OUT THE FULL, MELLOW BEAUTY OF THIS WOODEN BAR. NATURAL GARNET HAS LONG BEEN NOTED FOR ITS UNIQUE ABILITY TO BRING OUT ALL THE LATENT BEAUTY OF WOOD, AND JEWEL GARNET COMBINES THIS ATTRIBUTE WITH THE ABILITY TO DO IT FAST.



AND THIS BAR GOES INTO A TYPEWRITER. IT HAS TO BE EXACTLY THE RIGHT THICKNESS. SMALL, FINE DISCS OF JEWEL ABRASIVE GRIND THESE DELICATE TYPE BARS TO A PRECISION FIT, EVENLY, QUICKLY AND SMOOTHLY . . . AND TO SPLIT-THOUSANDTHS OF AN INCH ACCURACY.



HERE'S STILL ANOTHER KIND OF BAR—CALLED A DRAW BAR. THIS IS THE HIGHLY IMPORTANT COUPLING MEMBER THAT FASTENS RAILWAY CARS TOGETHER. CALCULATE THE STRENGTH THESE BARS HAVE TO HAVE IN ORDER TO PULL 130 FREIGHT CARS, EACH WEIGHING 30 TONS AND EACH LOADED WITH 40 TONS MORE. WELDISKS GRIND THESE HARD, TOUGH FORGINGS QUICKLY AND SAFELY.

Remember Jewel Abrasives next time you order from your jobber. There's a Jewel product for every grinding and polishing job.

ABRASIVE PRODUCTS, INC. JEWEL ABRASIVES MADE IN U.S.A. SOUTH BRAINTREE, MASS. U.S.A.

Abrasive Products, Inc.

SOUTH BRAINTREE 85, MASSACHUSETTS · MAKERS OF JEWEL COATED ABRASIVES

PRECISION
REG. U.S. PAT. OFF.
BRAND

SHIM and THICKNESS GAUGE STOCK

Prepared for your Convenience

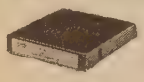
SAVES TIME • WASTE • BOTHER

SHIM STOCK
Brass or Steel
Single rolls 6"x100" each, 600 sq. inches to the carton. All popular thicknesses. Cellophane wrapped—moisture-proof.

ASSORTED SHIM STOCK
Brass — Steel
Contains an assortment in most popular sizes of Precision Brand Shim Stock. 4 separate thicknesses 6x50" each. Total 1200 square inches. Put up in easel type display dispensers cellophane wrapped.

THICKNESS GAUGE STOCK
Precision Brand Quality—tempered, polished and edged with rounded ends—size and brand etched on each piece. This comes in 12 inch lengths in individual envelopes. 12 to the box and 9 popular thicknesses to the carton.

SHIM PACKETS
Brass or Steel
Flat Stock — Total 6 Pieces. Each 3⅝"x6"—120 sq. inches. 2 pieces each .001, .002, .003. 48 packets to the box.



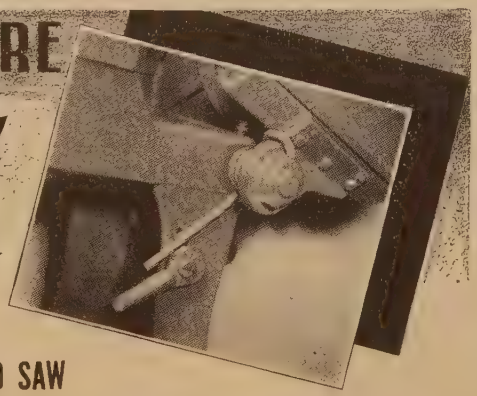
THICKNESS GAUGE STOCK
½" Wide
Precision Brand thickness or feeler gauge stock is manufactured from tempered and polished clock spring steel, specially for this purpose. It comes in dispensers—cellophane wrapper for moisture protection—and in 10 ft., 15 ft. and 25 ft. lengths. All popular thicknesses.

We now carry a complete stock of Drill Rods.
WRITE FOR FULL INFORMATION

SHIM STEEL
Heavy Sizes
6"x100" and 12"x120" in 200 pound test corrugated paper cartons. Thicknesses up to .031". Complete range.

PACKAGE GOODS DIVISION
*Reg. U.S. Pat. Off
PRECISION STEEL WAREHOUSE, INCORPORATED
4425 WEST KINZIE STREET • CHICAGO 24, ILLINOIS

BLADE PRESSURE
Positively Controlled

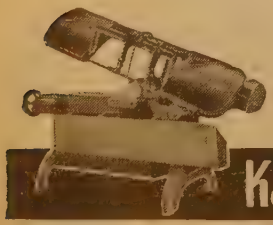


A FEATURE OF THE
KALAMAZOO METAL CUTTING BAND SAW

The adaptability of the Kalamazoo Metal Cutting Band Saw to all types of cut-off jobs is truly amazing. Heavy bars—tubing—hard metals—or soft metals can all be cut rapidly and accurately—as there is an instant adjustment to provide the correct saw blade pressure.

A lever operated cam having five positions is within easy reach to quickly adjust the spring tension to the job. Four holes are also provided to change cam location to compensate for weakening of spring.

Ask your dealer or write direct for complete information.



MACHINE TOOL DIVISION
Kalamazoo Tank & Silo Co., Kalamazoo 16, Mich.
In Canada—Bridge Machinery Co., Montreal.

Kalamazoo Metal Cutting Band Saw

(Continued from page 260)

trucks with capacities and chassis base prices ranging from 1000# to 30,000# and $1500 to $20,065, respectively, had a total net value of $1,152,987; thirty light and heavy duty tractors with chassis base prices ranging from $1685 to $3904 had a total net value of $53,959.91; seven crane trucks with capacities and chassis base prices ranging from 3000# to 10,000# and $6400 to $9500, respectively, had a total net value of $49,025; three special trucks with capacities and chassis base prices ranging from 2000# to 20,000# and $2365 and $9450, respectively, had a total net value of $19,830.

All net values are at factories after additions and deductions for variation from standard specifications, trade in allowances, etc., when applicable.

No adjustment has been made for cancellation of the following bookings: three platform trucks, value $7,500; two low lift trucks, value $4,720; one high lift truck, value $8,375; eleven fork trucks, value $53,289.

STRIKES
Jan. 1 to Feb. 1

International Typographical Union AFL—Gannett newspapers, Rochester, N. Y.

International Chemical Workers Union, AFL—Harrision, N. J., Gas works of the Public Service Electric and Gas Co. Wage dispute; 400 strikers.

Retail Clerks Union, AFL—Groceries in Los Angeles, Calif., area. Wage demands; about 4000 clerks.

Conference of Studio Unions, AFL, opposed by AFL, International Alliance of Theatrical Stage Employes—against studios in Hollywood, Calif. Strike is ramification of jurisdictional battle between Brotherhood of Carpenters, AFL, and IATSE.

American Newspaper Guild, CIO—Philadelphia Record, Camden (N. J.) Courier & Post.

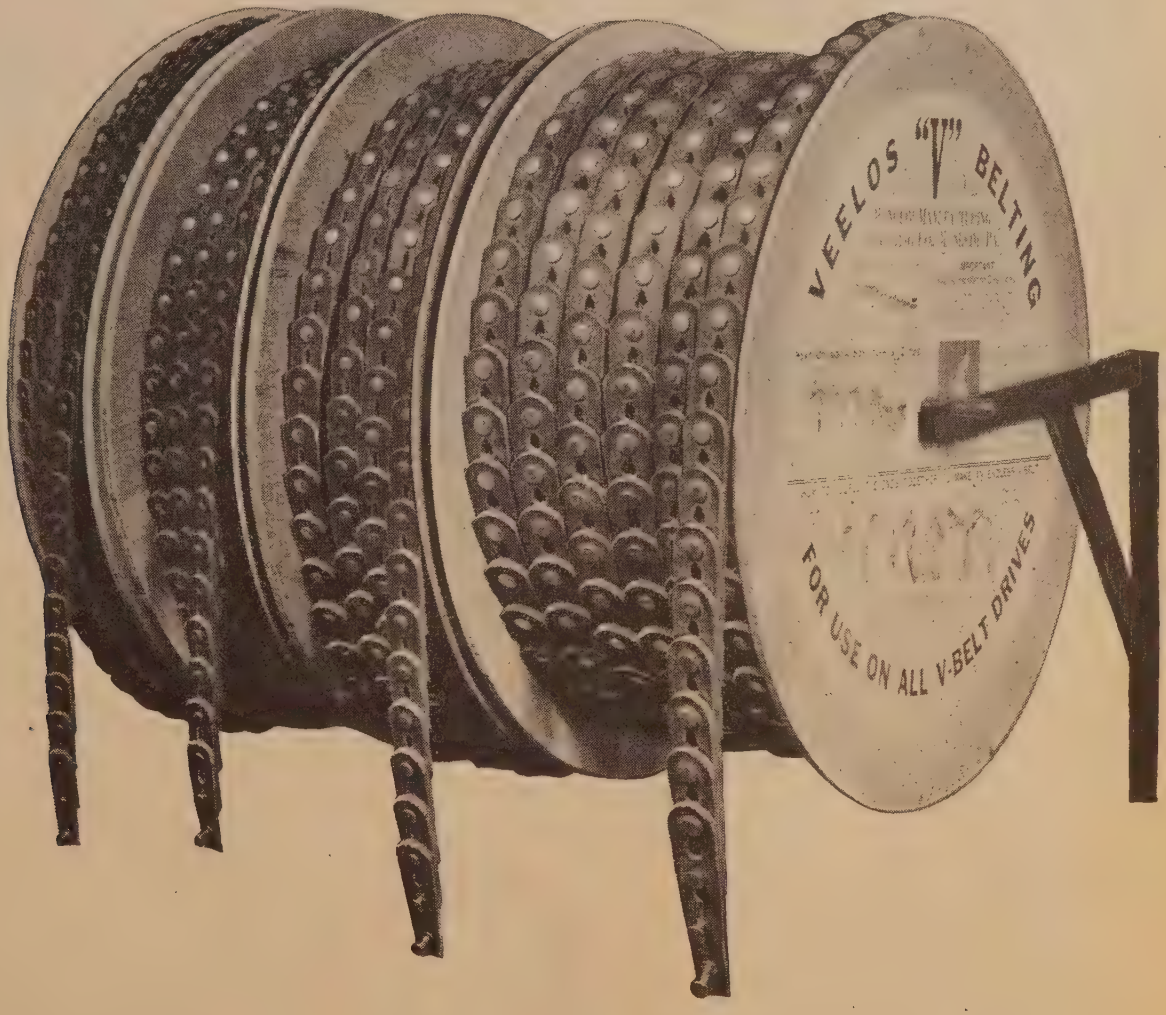
Building Service Employes, AFL—Loft buildings in midtown Manhattan, New York City. Strike resulted from failure of building owners to sign contracts on basis of "Midtown Frankenthaler Agreement"; about 500 strikers.

International Pressmen & Assistants Union, AFL—Kansas City Star, Kansas City, Mo. Srikers seeking union recognition.

(Continued on page 264)

Your COMPLETE V-Belt Inventory

can be as small (or smaller) than this!



You can replace 316 sizes of endless V-belt with only 4 REELS OF VEELOS

PERHAPS you do not need 4 reels. Maybe just one reel of Veelos will provide you with a complete V-belt inventory. For Veelos, the link V-belt, is supplied on reels to provide replacements for any length drive. You don't have to stock a complicated conglomeration of many sized endless V-belts. Consequently, when you use Veelos, your costs dwindle . . . stock records are simplified . . . obsolescence and deterioration of spare belts are eliminated.

Compact — 100-foot reels of Veelos save considerable storage space. Handy-belt replacements of any desired length are always available, easy to locate, quickly uncoupled, made endless and installed.

Veelos is available in all standard sizes . . . fits all standard grooves — perfectly. Avail yourself of the real belt savings afforded by Veelos on reels.

Over 300 Veelos distributors and sales engineers located in principal cities to serve you.

MANHEIM MANUFACTURING & BELTING CO., MANHEIM, PA.

VEELOS
THE LINK
V-BELT

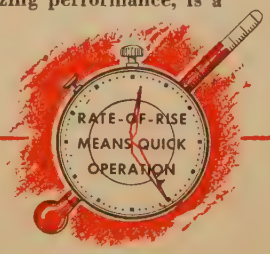
Adjustable to any Length
Adaptable to any Drive

Tested, Proved and Adopted by American Industry

Industrial America is rapidly becoming fire-hazard conscious. Obsolete and inadequate fire protection systems are being replaced by those systems which have clearly demonstrated their ability to protect.

"Automatic" FIRE-FOG, by virtue of its amazing performance, is a leader among modern fire protection systems. It quenches fires . . . even of flammable liquid origin. For example, when fire bursts forth at a FIRE-FOG protected oil quench tank, action is *automatic, decisive.* Instantly, the flames are beaten down . . . and seconds later, a would-be ruinous blaze is extinct. Within a matter of minutes production has been resumed.

"Automatic" FIRE-FOG is a proven safeguard for many types of serious fire hazards, ideal protection for oil filled electrical equipment, gasoline loading racks, enamel dip tanks and similar hazards. Write for complete information. It's yours for the asking.



THE SUPROTEX* SPRINKLER SYSTEM

A famous member of the "Automatic" Sprinkler Family. Designed particularly for use in manufacturing, mercantiles, warehouses, churches, schools, offices, hospitals, piers and other establishments where positive fire protection is a must.

*Trademark Registered U. S. Patent Office

FIRE PROTECTION

DEVELOPMENT ENGINEERING

"Automatic" Sprinkler

MANUFACTURE INSTALLATION

"AUTOMATIC" SPRINKLER CORPORATION OF AMERICA
YOUNGSTOWN 1, OHIO
OFFICES IN PRINCIPAL CITIES OF NORTH and SOUTH AMERICA

(Continued from page 262)

Atlantic Fishermen's Union of New Bedford, Mass.—Buyers and packers in New Bedford. Union demanded that fish be weighed in wire baskets instead of wooden boxes.

UAW, CIO — Allis-Chalmers Mfg. Co., West Allis, Wis.

Marine & Shipbuilding Workers of America—U. S. Steel's Federal Shipyard, Kearny, N. J. Protest against use of unskilled men on jobs calling for skilled workers; 400 welders and burners on strike.

Electrical Workers, AFL—Consolidated Telegraph & Electrical Subway Co., Manhattan and the Bronx, New York. Picketing open manholes in which members of Brotherhood of Consolidated Edison employes, division of CIO group, are employed. Two issues—determining collective bargaining agent—and putting 150 seasonal workers on permanent basis but reducing pay.

Typographical, Stereotypers and Pressmen's Unions, American Newspaper Guild, CIO—4 daily newspapers in Springfield, Mass.

Teamsters Union, AFL—Wholesale Food Merchants, Inc., New York City, Nassau County and parts of New Jersey. Dispute over arbitration clause in new working agreement.

● RWMA's Technical Executive

Preston M. Hall, outstanding in the resistance welding industry, has accepted the position of technical executive of the Resistance Welder Manufacturers' Association.

A former president of that organization, Mr. Hall has long been actively interested in association work and in the advancement of the industry generally, serving as chief of the Resistance Welding Section, WPB, from 1942-1945. During the summer of 1945, the Government sent Mr. Hall to England, Sweden and Germany as a special scientific consultant on welding, to investigate developments in those countries.

In 1923 Mr. Hall founded the Taylor-Hall Welding Co. and served as its president until the beginning of this year, when he resigned to devote his time and attention to being a special emissary of RWMA.

For the past six years, RWMA has been extremely active in the development of standards and specifications for resistance welding machines and equipment and has undertaken considerable educational,

(Continued on page 266)

"... a thousand warehouses!"

THE manufacturer meant he had Distributors all over the country who continuously maintained a stock of his products. What a tremendous inventory immediately accessible to industry everywhere!

The Distributors' business is to render quick, efficient service to all industries in the locality he serves. From them you can usually get the tools and supplies you need quickly without paying a premium for immediate service.

The Distributors' Sales Engineers can render you a real service. They get the news first about new products—price information is always on the tip of their tongues or in their brief cases and usually they are practical men who talk your language.

See them when they call on you.

Service is a two-way street and to serve you best they need your cooperation—which only means a little of your time.

* * *

Manning, Maxwell & Moore produce lifting and load-handling machinery and equipment for industry, transportation, and general use. Much of it goes through distributors to where it will do the most good. In our Muskegon plant, we build 'Budgit' Electric Hoists, 'Budgit' Crane Assemblies, 'Budgit' Chain Blocks, and other 'Budgit' specialties; 'Load-Lifter' Electric Hoists, 'Load-Lifter' and 'Shaw-Box' Cranes, as well as other material-handling machinery. The M M & M trademark on any product is a guarantee of the highest quality in its field.

MANNING MAXWELL & MOORE INC. M&M TRADE MARK

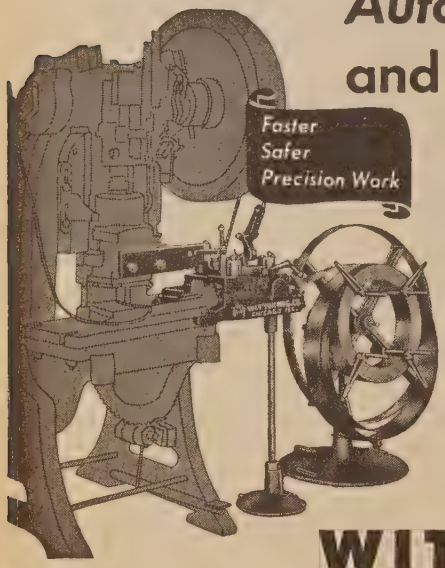
MANNING, MAXWELL & MOORE, INC.

MUSKEGON, MICHIGAN

Builders of 'Budgit' Hoists, 'Budgit' Chain Blocks, Crane Assemblies, Trolleys and Accessories; 'Load-Lifter' Electric Hoists and Cranes, 'Shaw-Box' Cranes; and other lifting specialties

Planning Peacetime Production Using Coiled Strip Stock?

Equip with WITTEK *Automatic* Roll Feeds and Reel Stands



Wittek Roll Feeds are being used extensively by war plants in their large volume production of high quality metal stampings. The flexibility of Wittek Roll Feeds will assist these plants in their peacetime conversion through their adaptability to various jobs. Keen competition will demand the utilization of equipment to its point of highest efficiency. If your postwar plans include punch press production of parts from coiled strip stock—investigate now the many possibilities of Wittek Roll Feeds and Reel Stands.

Write for catalog, prices and recommendations

WITTEK MANUFACTURING CO.
4305-15 West 24th Place, Chicago 23, Ill.

Automatic ROLL FEEDS AND REEL STANDS

Your Local Distributor Can Deliver From Stock

Write for Catalog Sheets showing and describing this most complete line of belt fastening needs — Belt Hooks, Belt Lacing, Lacing Machines, Round Belt Hooks and Couplings and Gear Wheel Pullers.

Because of our greatly increased production facilities, we are continuing to keep our industrial distributor stocked with *both* standard types of belt lacing.

WIREGRIP BELT HOOKS (6 sizes) come with the extra blue patented aligning cards that prevent card end waste—every hook usable. Applied with WIREGRIP or any other standard make lacing machines.

STEELGRIP BELT LACING—(11 sizes) come in convenient boxes or long lengths for wide conveyor belts. 2-piece hinged rocker pins take up wear and increase flexibility. Applied with a hammer, penetrates toughest belting, clenches into a smooth, "humpless" joint. STEELGRIP compresses and protects belt ends, prevents fraying of fabric belts.

ARMSTRONG-BRAY & CO. "The Belt Lacing People" 5358 Northwest Highway, Chicago 30, U.S.A.

(Continued from page 264)

promotional and research work. Under the direction of Mr. Hall, the Association is now greatly expanding this program.

Mr. Hall, whose headquarters will be the association's office, 505 Arch Street, Philadelphia 6, Pa., expects to spend considerable time in the field, cooperating wtih technical schools, engineering departments of universities, technical societies, and with industrial users.

• H. P. Ladds Honored

H. P. Ladds

At the sixty-first annual banquet of the Hardware Merchants' & Manufacturers' Association, held January 30, Herbert P. Ladds was presented with the gold medal and scroll which is awarded annually to an outstanding individual connected with the industry who, by his activities, has reflected credit upon American business. Mr. Ladds is president of the National Screw and Manufacturing Co., Cleveland, Ohio, and president of the American Hardware Manufacturers' Association.

The presentation was made by chairman of the Jury of Award, E. E. Candlee. Other jury members were Fayette R. Plumb and Paul A. Griffith.

Reelection of the following officers was announced at the banquet: President, Frank L. Campbell of Fayette R. Plumb, Inc., Philadelphia, Pa.; vice president, L. A. Hoeflich, Supplee-Biddle Co., Philadelphia; secretary-treasurer, Thomas A. Fernley, Jr., Philadelphia.

Directors include: Paul A. Griffith, Shields & Bro., Philadelphia; Edward K. Tryon, 3rd, Edw. K. Tryon Co., Philadelphia; J. H. Stauffer, Herr & Co., Lancaster, Pa.; R. O. Recknagel, Corbin

(Continued on page 268)

More than a Century OF MAKING VALVES ... and valves only

More than 100 years ago the Wm. Powell Company dedicated itself to the making of valves—*and valves only*. Thus Powell pioneered in the field of specialization long before the "age of specialization" arrived.

The soundness of this policy, backed by continual scientific advancement and the ability to meet every new demand as it has arisen, is attested by the high quality of Powell Valves today.

The Powell Line is so complete that there's a Powell Valve—*in Bronze, Iron, Steel, Pure Metals* or *Special Alloys*—to satisfy every known flow control requirement in every branch of modern industry.

Fig. 512—150-pound Bronze Gate Valve with screwed-in bonnet, screwed ends and inside screw, non-rising stem.

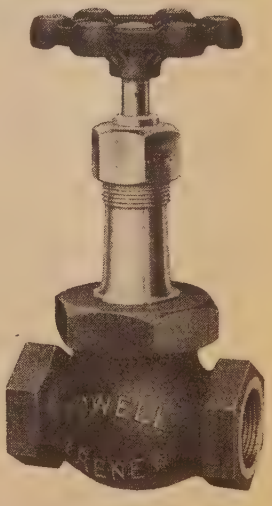


Fig. 190—150-pound Iron Body Bronze Mounted "Irenew" Globe Valve. Has screwed ends, union bonnet and regrindable, renewable wear-resisting "Powellium" nickel-bronze seat and disc.

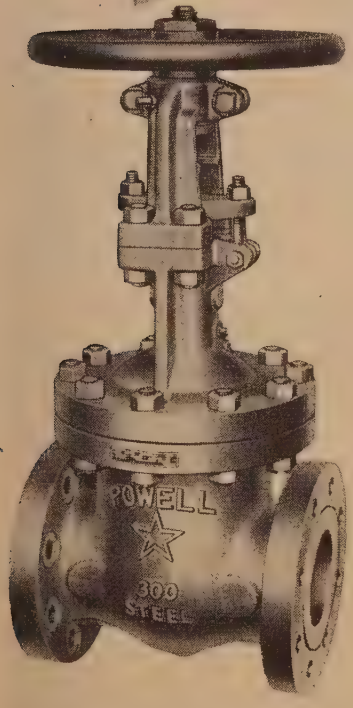


Fig. 3003—Class 300-pound Cast Steel Gate Valve. Has flanged ends, outside screw rising stem, bolted flanged yoke and taper wedge solid disc.

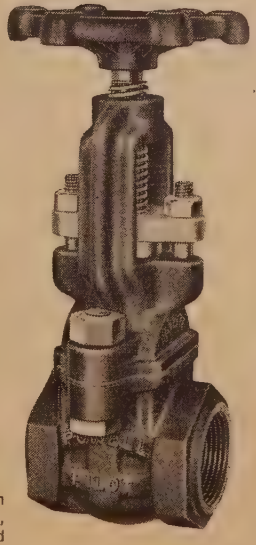


Fig. 480—All Iron "Pilot" Gate Valve with screwed ends, outside screw rising stem, bolted flanged yoke and taper wedge solid disc.

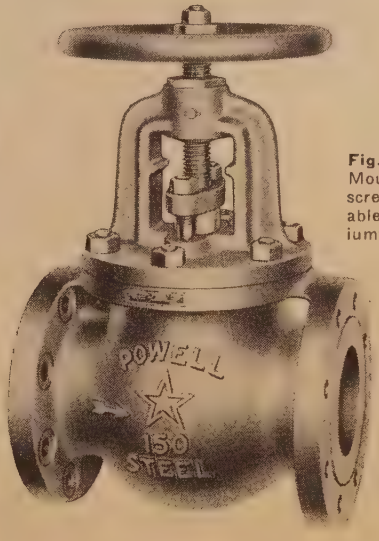


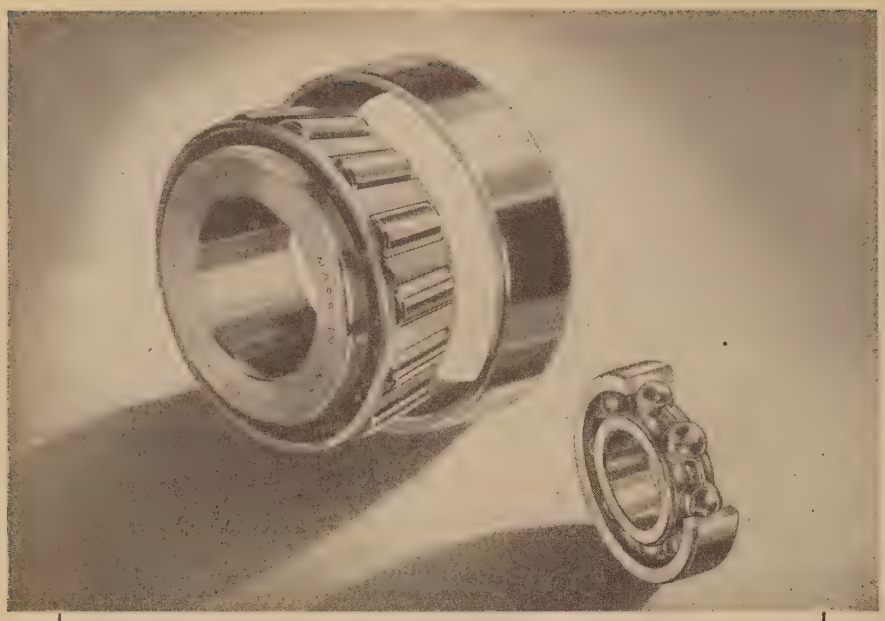
Fig. 1531—Class 150-pound Cast Steel Globe Valve. Has flanged ends, outside screw rising stem and bolted flanged yoke.

Fig. 1708—200-pound Bronze Globe Valve with screwed ends, union bonnet, renewable, specially heat-treated stainless steel seat and regrindable renewable, wear resisting "Powellium" nickel-bronze disc.

The Wm. Powell Co., Cincinnati 22, Ohio

DISTRIBUTORS AND STOCKS IN ALL PRINCIPAL CITIES

POWELL VALVES



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Eloquently

There's one silence that is never boring, that "tells" you what you want urgently to know. . . . the efficient, workmanlike silence of Ahlberg Bearings. It speaks eloquently of troubles prevented before they happen . . . "All's Well".

You get an all-inclusive service from Ahlberg jobbers.

- A complete line of ball and roller bearings: light weight, heavy duty, thrust load, radial, self aligning

. . and an up-to-the-minute counsel on newly developed application designs. A good idea . . . see your jobber or call Ahlberg.

AHLBERG BEARING COMPANY
3043 WEST 47TH STREET
CHICAGO 32, ILLINOIS

(Continued from page 266)

Screw Div., The American Hardware Corp., New Britain, Conn.; Harry D. Moore, Metal Sponge Sales Corp., Philadelphia, Pa.; Nelson D. Perine, Pennsylvania Lawn Mower Workers, Div. of American Chain & Cable Co., Camden, N. J.

Dr. Samuel Steinmetz of Trenton, N. J., philosopher and humorist, spoke on "Horse Sense, Common Sense and Nonsense."

A record of his various activities and services to industry and to the community was given in the scroll presented with the gold medal to Mr. Ladds.

• Heads Textile Group

G. W. Marshall, Jr., general manager of the Asbestos Textile & Packing Division of Raybestos-Manhattan, Inc., Manheim, Pa., has been elected president of Asbestos Textile Institute. The institute, with headquarters at 12 South 12th St., Philadelphia, Pa., is an association of the leading manufacturers of asbestos textiles whose object is to promote the use of asbestos textile products.

• Articles on Welding

The American Welding Society has announced the 1947 A. F. Davis Undergraduate Welding Award consisting of four cash prizes, totalling $700, to be given to the authors and publications for the two best articles on welding published in undergraduate magazines between July 1, 1946 and April 1, 1947. A prize of $200 will be given to the author or authors of the best article on welding and a similar award of $200 will be given to the publication in which this article appears. The author or authors of the second best article will receive $150 and another $150 will go to the magazine in which it is published. Particular attention is directed to the time limit to April 1, a permanent change from the previous closing date of July 1st for this annual contest conducted by the American Welding Society.

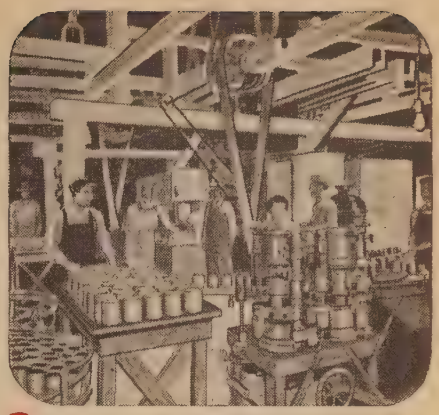
The articles may be on any phase of any type of welding or its application to design or construction and must be published within the time limits to be eligible for the 1947 prizes. Any undergraduate of any college or university in the United States, its possessions, or Canada, is eligible.

The papers will be judged by a

(Continued on page 270)

1 **1809**—"Canning" was discovered by Nicolas Appert, a Frenchman. His crude food preserving methods, using bottles for containers, won for him great acclaim and a grant of 12,000 francs from the Emperor Napoleon.

2 **1850**—The art of canning had spread far and wide. In home kitchens, barns, crude buildings, food was "preserved" for future use. Work was done by hand, mostly by women. Electrical horsepower was still to come.



3 **As early as 1915,** Howell engineers were working with machinery manufacturers to apply industrial type motors that were destined to up production, eliminate unnecessary human handling of foodstuff and cut costs.

Then canning became a major industry!

4 **Today**—Progress in harvesting, processing, distribution and the use of specially designed, electrically-driven machinery have upped production and made Canning a major industry.

Now millions enjoy at low cost, foods out of season, vegetables, soups, meat products, and other foodstuffs.

In the Canning Industry, you'll find Howell industrial type electric motors driving conveyors, rotating kettles, operating cookers, fillers, weighing, counting and packaging machines, and cleansing apparatus. You'll find them in all other great industries, too.

If you want motors to operate under gruelling conditions—motors that are precision-built specially for industrial use—buy horsepower by Howell.

Be wise—buy industrial type Howell Motors! They're designed for the toughest tasks in industry; consequently, they perform better on *all jobs!*

Howell Enclosed, Fan-Cooled Motor—Type K

HOWELL MOTORS

HOWELL ELECTRIC MOTORS CO., HOWELL, MICH.

Manufacturers of Quality Industrial Type Motors Since 1915

"More perfect cost ANALYSIS and CONTROL *impossible* with our present system. Look into possibilities offered by the E-Z SORT SYSTEM now being used by competition!"

Here Are Just a Few Users of E-Z SORT:

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Where you see Neff & Fry Storage Bins, you see monuments to the foresight of men who looked into the future. For N & F Bins have the stuff and stamina to survive from one generation to the next with virtually no maintenance expense.

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Our experience covers such a range of storage and handling problems that we can give you profitable engineering information. It will pay you to consult with us before reaching a decision. This, of course, involves no obligation.

The distinctive features of N & F Super-Concrete Staves and our methods of erecting bins are explained in our catalog. It also pictures a number of typical installations. Write for a copy now while the subject is on your mind.

THE NEFF & FRY CO. CAMDEN OHIO

(Continued from page 268)

group selected by the American Welding Society. Judging will be done on the basis of originality of subject, originality and clarity of the presentation and the thoroughness with which the subject is presented. The authors and publications to receive awards will be notified by mail on May 15, 1947. The awards will be presented during the annual meeting of the American Welding Society to be held the week of October 19, 1947, at Chicago.

Funds for this annual award program were donated to the Society by A. F. Davis, vice-president and secretary of the Lincoln Electric Co.

• Government Atomic Laboratory

Construction of the Knolls Atomic Power Laboratory to be built near Schenectady, N. Y. by the Atomic Energy Commission will start this spring, it has been announced by L. E. Johnston, area engineer for the Commission. The laboratory is being erected under supervision of the General Electric Co. which will operate it for the government when completed. Mr. Johnston said that scientists and engineers will probably begin to occupy the new building by the middle of 1948.

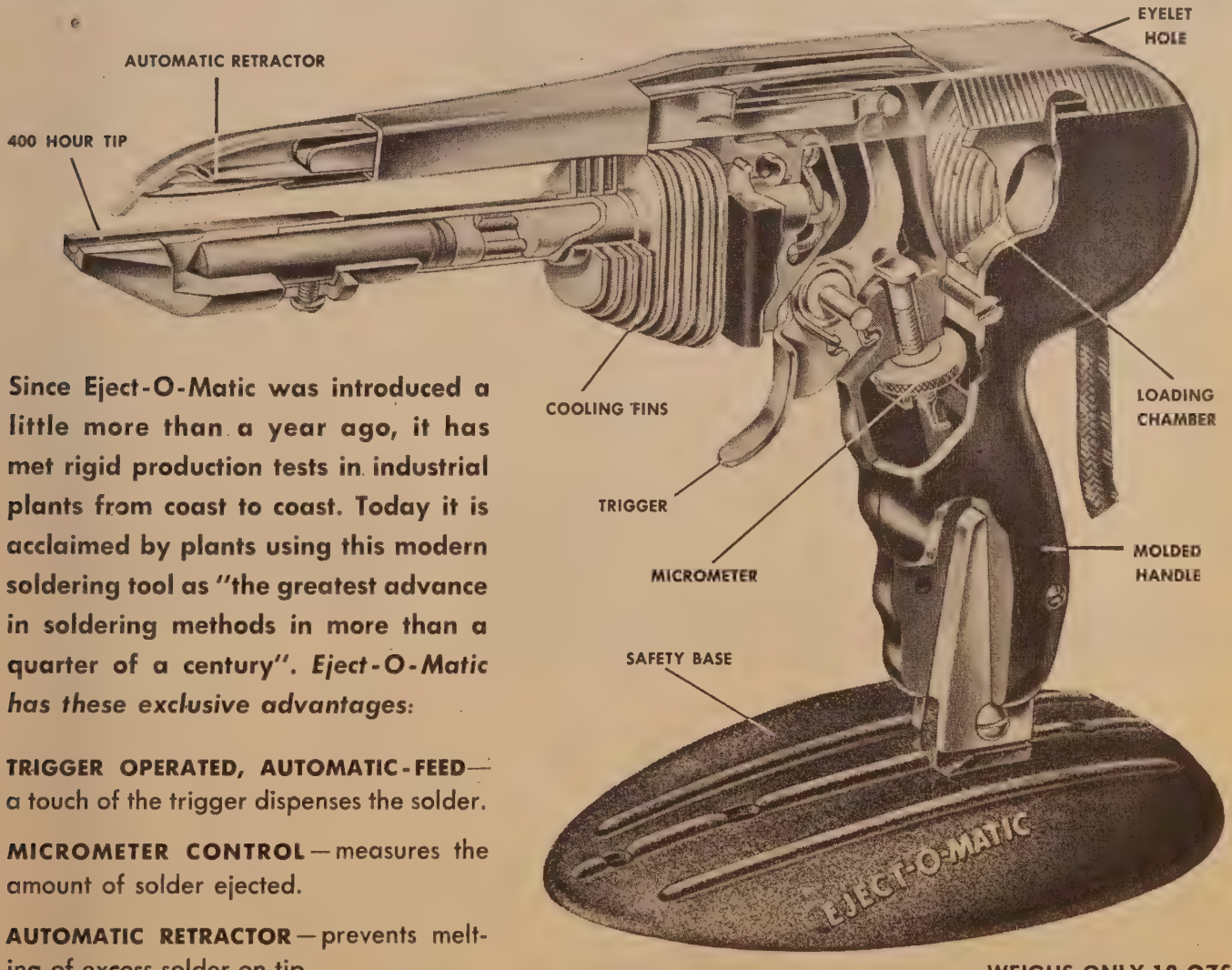
The new atomic laboratory is to be located on part of a 386-acre tract in nearby Niskayuna. On another part of the property the new General Electric research laboratory is now rising. The two laboratories, whose work will closely mesh, are to be operated as a unit under the direction of Dr. C. G. Suits, G-E vice president and director of the research laboratory.

A number of scientists for the project have already been recruited, said Dr. Suits, and are at work in the present G-E laboratory buildings. More are being employed as rapidly as qualified men and women can be found. Physicists, metallurgists, chemists and chemical engineers—technical men of all kinds—are needed, he declared.

A number of buildings will form the Knolls Atomic Power Laboratory. In one will be located an experimental pile. Such a pile, it is expected, will form the firebox and boiler of future atomic power plants. Other buildings of the group will be devoted to offices, metallurgy, chemical engineering and chemistry. Another building will house a 3,500,000-volt electrostatic, or Van de Graaff, generator, for

(Continued on page 272)

the inside story OF AMERICA'S MOST EFFICIENT SOLDERING IRON



Since Eject-O-Matic was introduced a little more than a year ago, it has met rigid production tests in industrial plants from coast to coast. Today it is acclaimed by plants using this modern soldering tool as "the greatest advance in soldering methods in more than a quarter of a century". *Eject-O-Matic has these exclusive advantages:*

TRIGGER OPERATED, AUTOMATIC-FEED—a touch of the trigger dispenses the solder.

MICROMETER CONTROL—measures the amount of solder ejected.

AUTOMATIC RETRACTOR—prevents melting of excess solder on tip.

400-HOUR TIP, MULTI-CLAD—non-corroding, never needs filing or tinning.

COOLING FINS—keep tip at proper working temperature—no thermostat required.

LOADING CHAMBER—easily accessible, holds 4 oz. reel of solder.

EYELET HOLE—permits automatic feeding of solder from large rolls mounted on, or under, bench.

MOLDED HANDLE—made of heat-resistant plastic.

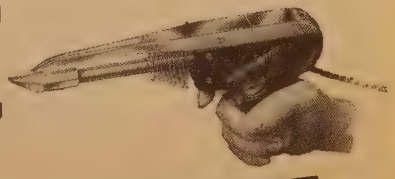
SAFETY-UTILITY BASE — provides resting place for idle or cooling iron.

WEIGHS ONLY 18 OZS.

Write for descriptive literature or, if you wish, we shall be glad to arrange for a demonstration.

Available in 50, 75, 100 and 150 watt models. Tips in 6 different sizes and shapes.

Individually packed. Shipping weight per carton of 12 units, approximately 35 lbs.



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You'll Save 30%* or more
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Clipper Belt Hooks with
Modern Clipper Belt Lacers
*TIMKEN ROLLER BEARING CO. AND OTHERS EFFECT THIS SAVING IN BELT LACING COST.
In over 30 years experience manufacturing belt lacing equipment exclusively, Clipper has developed the world's finest belt hooks. To get the best service from these top quality hooks apply them with a modern belt lacer such as the Clipper No. 9 Portable. This combination will save you money. See your Mill Supply Jobber for demonstration.
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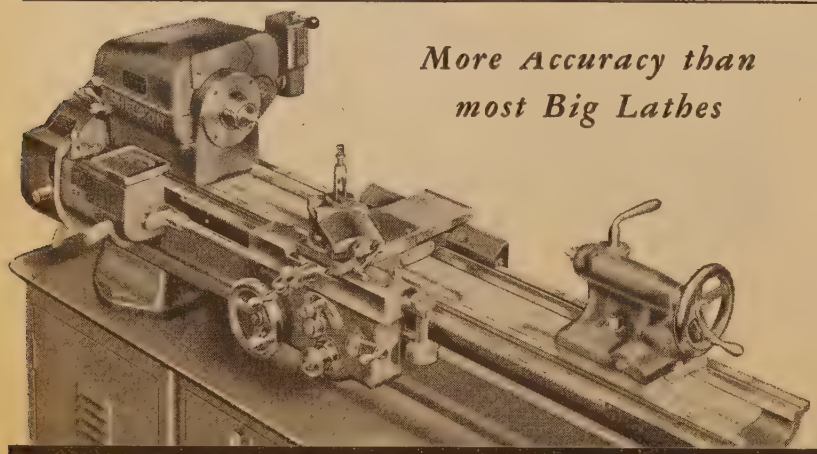
LISTED UNDER REEXAMINATION SERVICE UNDERWRITERS' LABORATORIES, INC.
Clipper
BELT LACING EQUIPMENT

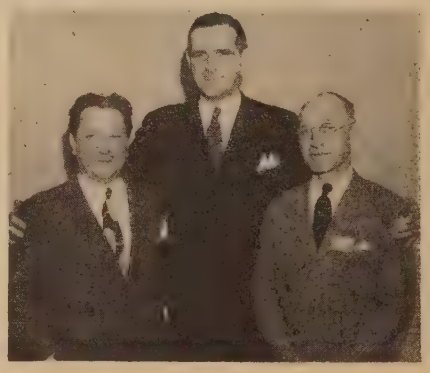

More Accuracy than
most Big Lathes
New SHELDON
TRB-S56 Precision Lathes
There is a degree of accuracy built into the new $1000.00 Sheldon TRB-S56 Precision Lathe heretofore found only in a few of even the most costly lathes. For example, spindle bearings are "Zero Precision," the very finest, closest tolerance tapered roller bearing manufactured. The heavily strutted, 1-piece bed has 2 V-ways and 2-flat ways ground on special bed grinder and held to the closest tolerance of lateral and parallel alignment. The lead screws are milled on the most accurate special lead screw milling machine.
In the Sheldon TRB-S56 modern engineering, extensive tooling combined with the finest special machinery—a modern machine tool plant with modern equipment, modern manufacturing methods—give this small (11¼" swing, 1" collet capacity, 56" bed, 8 speed—50 to 1550 r.p.m.), convenient, moderate priced lathe, the permanent accuracy and features, heretofore found only in more cumbersome and costly lathes.
Write for circular
"Zero Precision"
SHELDON MACHINE CO. Inc.
Manufacturers of Sheldon Precision Lathes • Millers • Machines • Shapers
4248 N. KNOX AVENUE • CHICAGO 41, ILLINOIS, U.S.A.

(*Continued from page 270*)

atom-smashing studies. J. Gordon Turnbull, Inc., of Cleveland, is the architect for the new laboratory.

An earlier government announcement about the new laboratory said that its purpose would be to conduct research in all phases of atomic power development, and that in addition research on specific problems in connection with the operation of the Hanford Engineer Works in the State of Washington, now operated by General Electric's Chemical Department, would be carried on in the new facility.

• Warehousemen Officers



The same officers who guided the Merchandise Division, American Warehousemen's Association, through its first full year of peacetime business will continue to direct its activities during 1947, as a result of elections held by the Division's membership at the 56th Annual AWA Convention in January at Cleveland, Ohio.

Division officers, left to right, above, are: J. Leo Cooke, vice president; Clem D. Johnston, president; and R. M. King, treasurer.

Mr. Cooke is executive vice president of the Lehigh Warehouse & Transportation Co., Newark, N. J. Mr. Johnston is president of the Roanoke Public Warehouse, Roanoke, Va., and Mr. King is president of King Storage Warehouse, Syracuse, N. Y.

Have you ordered your set of Maintenance Manuals? Turn to Page 139 to find Manual No. 19 which concerns wiring and distribution systems.

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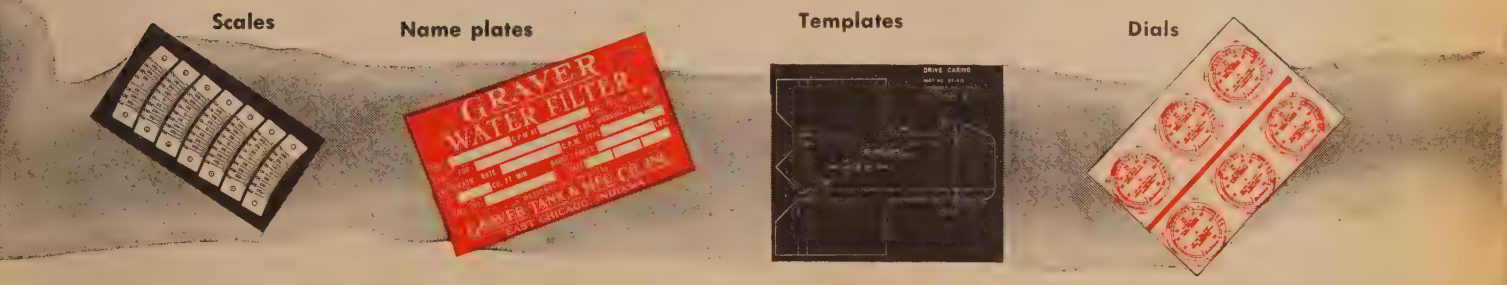
Color effects . . . white Transfax can be applied on any color surface—using the color as the background, or reversed, using Transfax as the background—to give you a variety of color arrangements.



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The cost is low . . . neither darkroom nor special skill is necessary—and time required is as little as 5 minutes.

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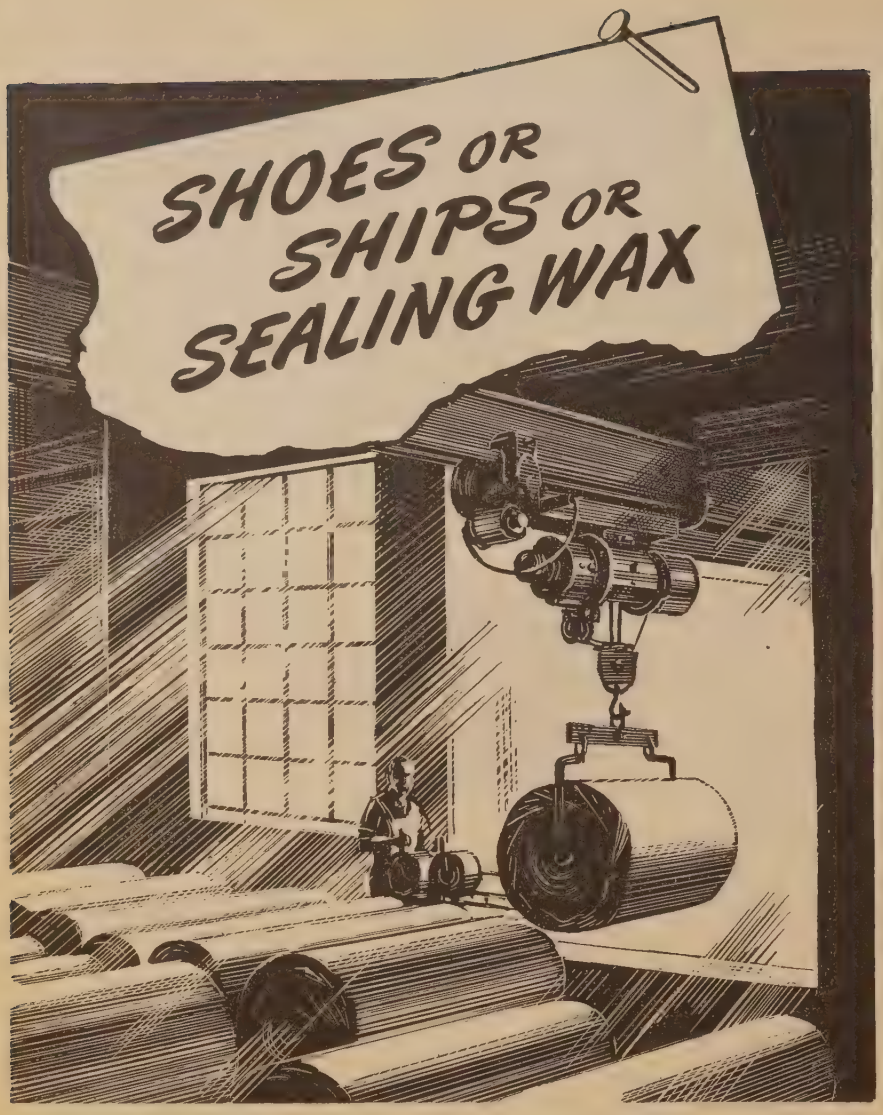
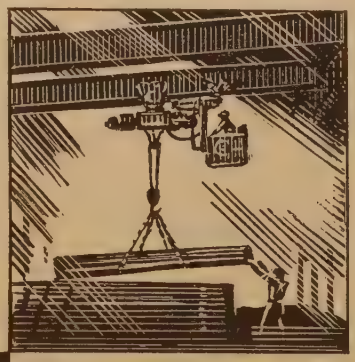


Regardless of what you make, it's safe to assume you have the problem of lifting, moving and depositing raw materials, semi-finished or finished products. Where such loads involve weights from ⅛ to 20 tons and where they must be handled smoothly, easily, economically and efficiently, consider the advantages of Shepard Niles hoists.

America's oldest builder of electric hoists and cranes offers you more than 5,000 styles and sizes from which to make your selection. Without obligation on your part, trained, experienced Shepard Niles engineers will study your requirements and recommend the hoist most suitable for the job.



Shepard Niles
CRANE & HOIST CORPORATION

Moving heavy loads, indoors or out, is no job for human muscles or inefficient handling equipment. If you want to extend your improvements in shop practice to material handling, ask Shepard Niles engineers to assist you in selecting the electric crane to handle your loads with speed, safety and economy.

384 SCHUYLER AVE. • MONTOUR FALLS, N. Y.

COMPANY ACTIVITIES

• Motion Picture About Rope

"Forty Centuries of Service" is an industrial and educational motion picture telling the story of rope. It is a 16 mm, black and white, sound motion picture, having a running time of about 33 minutes. It was produced by American Manufacturing Co., Brooklyn, N. Y., cordage manufacturer.

"Forty Centuries of Service" briefly traces the historical background of rope through early Egyptian dynasties going back nearly 5000 years. Actual specimens of rope at this age are shown. Three samples date back to the eleventh dynasty—about 2134 to 1991 B.C. Another is from the third or fourth dynasty—2780 to 2560 B.C.—making the age of this rope between 4500 and 4700 years.

Inspecting Manila Fibre

An interesting fact is that these old ropes are of varying constructions. One is two-strand; another, the conventional three strand, is generally identical to rope made today. A third specimen consists of three right-lay ropes put together with a left lay, making what now is known as "cable construction." This, plus the surprising perfection of the samples would indicate that the manufacture of rope dates back more than 5000 years.

From the historical opening the picture uses an animated map to show the sections of the world from which the cordage industry obtains its raw fibres. A considerable portion of this sequence takes the audience through the Philippines to see the growing, harvesting and preparation of Manila fibre for ropemaking.

The transition to manufacturing shots is made by following a shipment of Manila fibre to the American Manufacturing Company's

(*Continued on page 276*)

Leadership through 44 years...

W. W. Vosper, inventor of Toledo Tools and now Chairman of the Board, is shown above in third row center (displaying large watch chain).

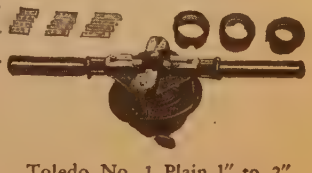
...a page from the early days of TOLEDO PIPE TOOLS!

Experience means a lot in building any product. In the field of pipe fitting—there's a wealth of engineering and manufacturing know-how behind all pipe tools and power pipe machines bearing the famous TOLEDO trademark!

Toledo experience goes back 44 years . . . to the days of the Iroquois Theatre fire . . . the Wright Brothers' first airplane flight . . . and the start of the Panama Canal. Through the years—Toledo has jealously guarded its reputation for producing top-quality tools . . . of high accuracy and dependability. . . . available to you at low prices.

The long-term service record of our employees is also important to you—assuring better products and better service. The *average term* of employment is—Factory employees... 12 years • Working supervisors...23 years • Foremen...27 years • Salesmen... 12 years • Officers and Dept. Managers...29 years.

Toledo is proud of this record of service and it assures the hundreds of thousands of Toledo users that Toledo Tools and Power Pipe Machines are of the highest standard of quality and efficiency. When you tool up with Toledo you are tooled up *right!* Our distributors—your dealer—will serve you. The Toledo Pipe Threading Machine Company, Toledo, Ohio. New York Office, No. 2 Rector Street Building.



Toledo No. 1 Plain 1" to 2" Threader pioneered the Toledo line and is still preferred by many users today.

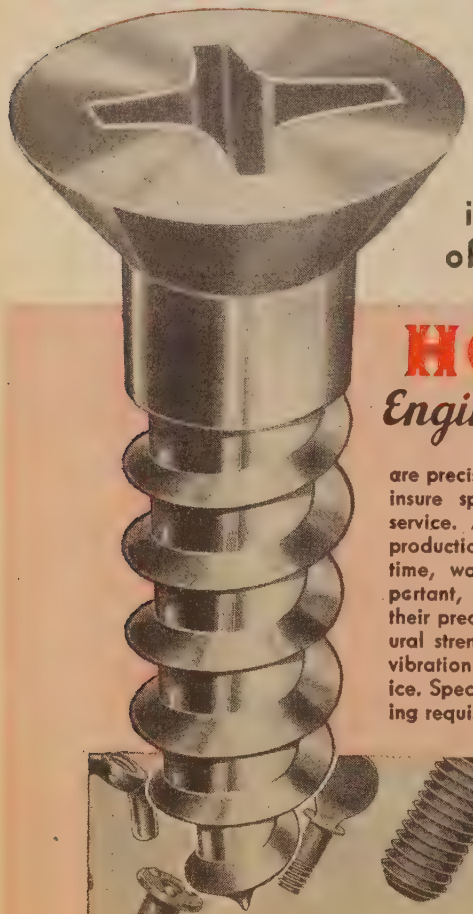
"TOLEDO" TRADE-MARK REGISTERED

TOLEDO

PRECISION PIPE TOOLS

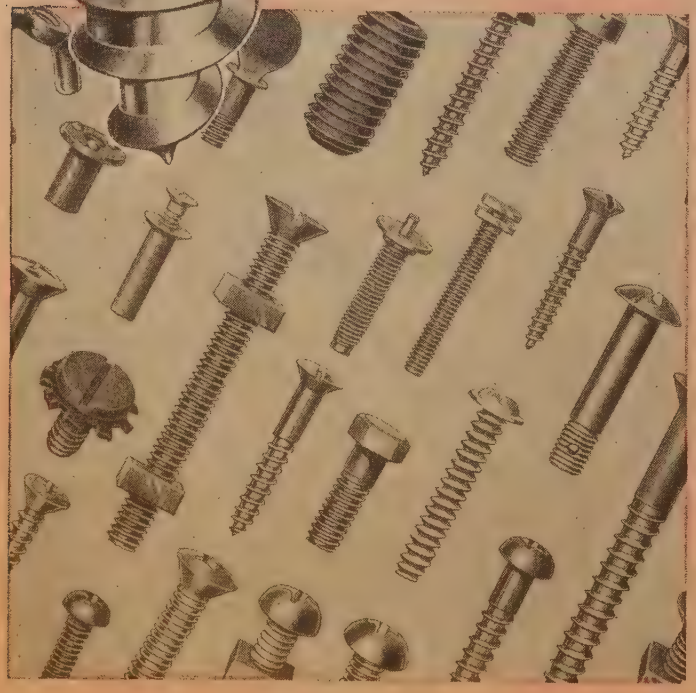
The Life of Your Product Hangs by a THREAD

The screws, bolts, nuts or other threaded fastenings used in the assemblies of your product are determining factors in the length of its consumer service.



HOLTITE
Engineered Fastenings
REG.U.S. PAT. OFF.

are precision-made of the finest materials to insure speedy application and enduring service. Accurate and rugged they effect production economics by reducing driving time, waste and spoilage. But most important, in the assemblies of your product their precise, uniform thread form and structural strength defy the loosening effects of vibration to assure long, trouble-free service. Specify HOLTITE for your next fastening requirements.



CONTINENTAL SCREW CO. New Bedford Mass., U.S.A.

(Continued from page 274)

docks on New York's East River.

From unloading, the camera goes on to the complete manufacturing operation. First, you see Jute fibre being made into soft twines—then, other soft fibres being converted into oakum and packing.

"Laying up" a 12" rope.

Most impressive of the manufacturing shots is the forming of a 200-yarn strand, which is then shown being "layed up" into a 12-inch circumference hawser on one of the world's largest rope laying machines.

The final sequence of the picture is a series of shots showing the use of rope and twines on farm and ranch, aboard ship, in oil fields, by fishermen and in manufacturing industries. The end is a spectacular record of commercial swordfishermen pursuing and "ironing" the huge fish.

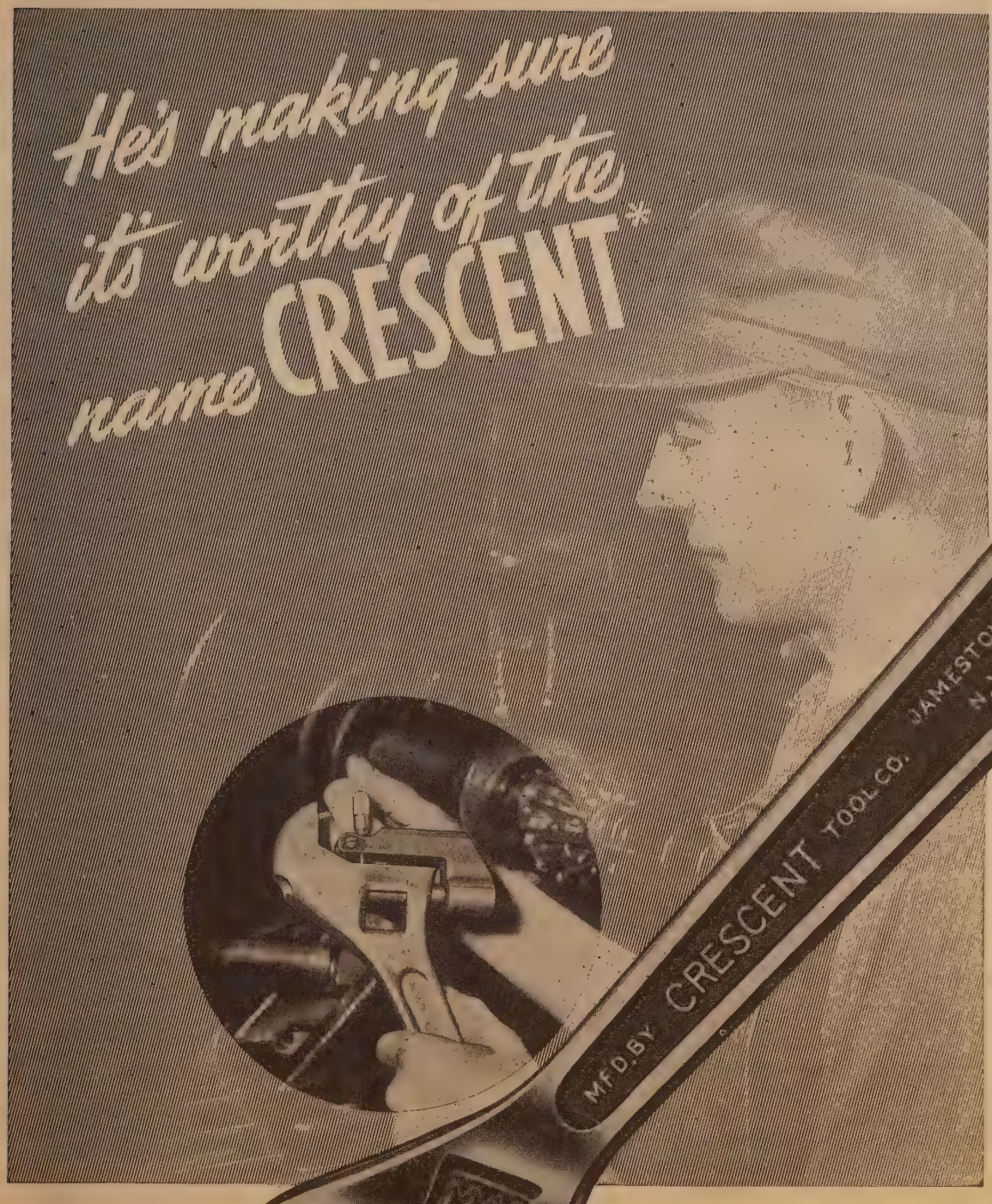
"Forty Centuries of Service" will be shown at exhibits, conventions and at jobber and dealer meetings throughout the country. Information regarding scheduled showings may be had by writing to American Manufacturing Co., Noble and West Sts., Brooklyn 22, N. Y., or to the western division, St. Louis Cordage Mills, 11th and Lafayette Streets, St. Louis 4, Mo.

● Busser Supply Co. Marks 20th Anniversary

An expansion program which will give one of the most modern wholesale distribution units to the area of central Pennsylvania is marking the twentieth anniversary year of The Busser Supply Co., Lewisburg, Pa. The company now has three large warehouses, two showrooms and offices and has under construction two additions to the present showrooms and offices. Plans call for an extension of 74 ft. to the one building and one of 58 ft. to another building.

The building program will in-

(Continued on page 278)



*"CRESCENT" is our trade mark in the United States and foreign countries for wrenches and other tools. "Crescent" tools are made only by Crescent Tool Company of Jamestown, N. Y.

Fast!
Lightweight!
Economical!

The
"FLORLINE"
MARKING MACHINE
THAT MAKES SAFETY AND PARKING LINES AT WALKING SPEED!

$89.50
F.O.B. Detroit

- One man . . . one hand operation
- Easy to use . . . easy to clean
- Pays for itself quickly
- Portable . . Compact . . Durable
- Curved or straight lines

USED BY FACTORIES, AUTO DEALERS, PARKING LOTS, ON HIGHWAYS, ETC.

Dealerships available some areas

H.C. SWEET COMPANY
3729 FENKELL AVENUE
DETROIT 21, MICH.

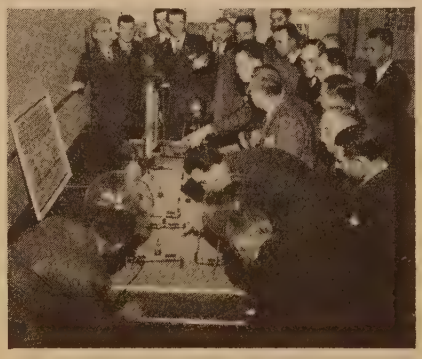
(*Continued from page 276*)

crease present office space by about 50% and will add approximately one third more space for general display purposes. Width of the building, when completed, will measure 32 ft. All offices will be air conditioned. The building program is expected to be finished by May 1.

The Busser Supply Co. was founded in January, 1927, when William J. Busser, Jr., the present president, purchased the plumbing and heating firm of J. F. Reber and transferred its interests to the broader field of wholesale distribution. In recent years it has added air conditioning equipment, paints and paint accessories to its already large line of merchandise.

Associated with the company for the past 17 years has been David A. Alspach who in July, 1946, became officer manager and assistant purchasing agent. A Lake Locum, oldest employe in point of service, began with the company 19½ years ago and was made sales manager in January. As part of the general expansion program an office will be built for his use. The average length of service of Busser employes is six years, with six employes exceeding this average by 15 years. The firm delivers most of its supplies in the Central Pennsylvania area by truck.

● Esso Training Center



Employes study operations of a model acid-treating plant in classroom at the Center.

A new Esso Training Center has been opened at Elizabeth, N. J., to mark inauguration of a greatly expanded employe training program of the Standard Oil Company of New Jersey. M. J. Rathbone, company president, officiated at the formal opening and announced that the Center is dedicated to company employes in recognition of the fact that "people want the opportunity to advance in accordance with their own ambitions."

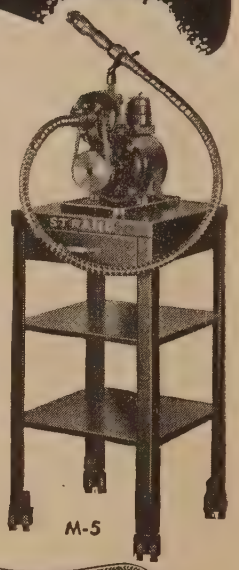
(*Continued on page 280*)

when you want Speed–
when you want power–

. . . in your job of grinding, polishing, buffing, sanding, drilling, reaming, screw-driving or nut-setting, you want a Strand Flexible Shaft machine, because a Strand will do it faster, better, and stand up to it longer.

Strand Flexible Shaft machines provide constant speeds with greater operator convenience. Hundreds of attachments easily interchanged—125 types and sizes—models include vertical and horizontal type machines from ⅛ to 3 h.p. Distributors in all principal cities.

Send today for catalog showing complete line



Strand
FLEXIBLE SHAFTS
N. A. STRAND & CO.
5013 NO. WOLCOTT AVE. CHICAGO 40, ILL.

IMMEDIATE DELIVERY

Model AR

You can depend upon Redington to make ***immediate delivery*** of these sturdy, 100% accurate Counters — "Watchdogs of Production." In models to fit punch presses, pumps, screw machines, packaging machines . . . conveyor lines, can making and box making machinery . . . in fact, ***all*** types of machinery and production lines. Easy to install. Write for Catalog.

F. B. REDINGTON CO.
106 So. Sangamon St., Chicago 7, Ill.

Brightboy

REG. U. S. PAT. OFF.

the SOFT RUBBER BINDER CUSHIONS *the Abrasive*

BRIGHTBOY STANDARD
Favorite for burring, finishing and polishing on the widest variety of metals and metal parts.

BRIGHTBOY FINE-TEX
Smoother, finer texture for work on softer metals, producing special finishes and for applications where the coarser wheel might not be suitable.

BRIGHTBOY TUFF-TEX
Tougher texture, for finishing hard metals. The tougher binder accents the abrasive action, yet retains the soft rubber cushion, finishing and pre-polishing in one operation.

Precision, Close-Tolerance BURRING–FINISHING CLEANING – POLISHING

All in One Operation

Bridges the gap—does *all* the finishing—between the grind and buff.

No preparation required on this versatile abrasive, which works on all metals and plastics. Today, in an era of rising production expenses, versatile Brightboy will give you substantial savings in time and labor.

Ask your regular dealer for a Brightboy catalog, with methods and applications data. Or write to have a Brightboy technician call to recommend operation short-cuts.

WELDON ROBERTS Brightboy REG. U. S. PAT. OFF.

BRIGHTBOY INDUSTRIAL DIVISION

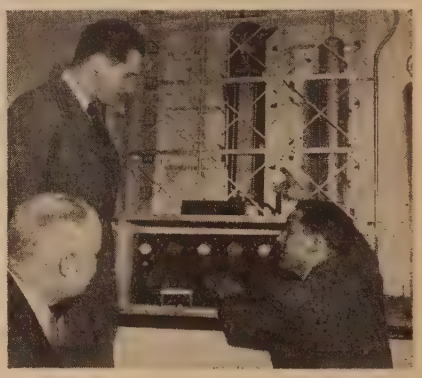
WELDON ROBERTS RUBBER CO. Newark 7, N. J.

GIVE GRAVITY
a better break with
BUSCHMAN PORTABLE
CONVEYORS
SPEED
PRODUCTION
•
CUT
HANDLING
COSTS
Buschman Portable Conveyors are designed to do a better job than the ordinary conveyor. Both Roller and Wheel types have full ball bearings mounted in sturdy steel frames. Convenient, straight and curved sections are combined with Buschman's exclusive "Quick-Eez" couplings. Quick adjustable stands, mobile units and many other features give ease of handling to many conveyor applications. Write for full details on these smoother-running, trouble-free conveyors.
Representatives in Principal Cities
THE E. W. BUSCHMAN CO., Inc.
4405 CLIFTON AVE., CINCINNATI 32, OHIO

(*Continued from page 278*)

The Center is located in the downtown business district and will offer company-wide services for group instruction.

"We need to increase the capacity of our people to produce because therein lies the way toward higher production and lower costs. We want to help our people because we recognize that the desire to produce is even more important than the skill to produce," Mr. Rathbone said.



Miniature working model demonstrates operations of fluid catalyst unit.

Pointing out that this centralized training is but one phase of the overall program of personnel development which starts with the orientation of new employes and continues to the highest echelons with the Executive Development Program, Mr. Rathbone emphasized that "there is no substitute for on-the-job instruction and that remains the backbone of training in our company."

"However," he said "through an orderly study of our personnel requirements and the capabilities of our employes, we are able to plan continually for upward progression by special training courses and job-rotational systems."

"Schedules are established showing experience requirements, and potential incumbents for many of the positions in the company, and action taken regularly to move the scheduled men from job to job in order to provide them with broad background and rounded experience. This carries on until it is embodied in the Executive Development Program in which even plant managers receive assignments to broaden their knowledge of our organization."

Turning towards the actual philosophy of the Center training, Mr. Rathbone said, "To begin with, the supervisor is the key man and we recognize that by putting unusual

(*Continued on page 282*)

Free Bulletin on Delta* 17" Drill Press

Gives you detailed information, to keep you posted on one of the industry's most complete lines of low-cost manual and power feed units

There's a low-cost Delta 17" Drill Press to meet just about every requirement. This handy bulletin helps you do a creditable job of selecting the *right* machine for a specific job:

It describes Delta Multiple-Spindle Drill Presses that are furnished with one-piece tables — or with sectional tables that permit a wide variety of production combinations.

It describes Delta Power Feed Drill Presses that provide eight rates of feed for each spindle speed, so that the correct rate is always available.

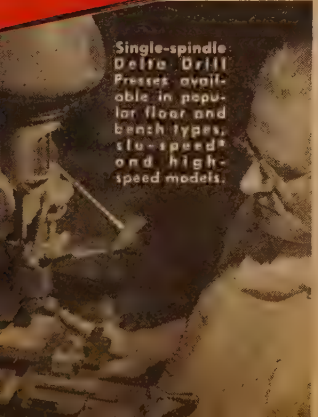
It describes Delta Single-Spindle Drill Presses with standard tilting tables, production tables, or production tables and foot feed.

It describes the Delta Slo-Speed* Attachment, for use where extra-slow drill press operation is necessary for spot facing, reaming, counterboring, core drilling, and drilling of hardened parts.

It describes famous Delta construction features that have helped to make Delta Drill Presses popular in shops where low first cost, low maintenance cost, and trouble-free performance are important.

Send for free copy of this informative bulletin today. Use coupon below.

Or, ask your Delta distributor for further details on Delta 17" Drill Presses. He is listed under "Tools" in the classified section of your telephone directory.



Delta Manufacturing Division
Rockwell Manufacturing Company
Milwaukee 1, Wisconsin

*Trade Mark Reg. U. S. Pat. Off.

ROCKWELL
DELTA
MILWAUKEE

WMS-14

TEAR OUT COUPON AND MAIL TODAY!

DELTA MANUFACTURING DIVISION
620C E. Vienna Ave., Milwaukee 1, Wisconsin

Send me a free copy of Bulletin A-17 on Delta 17" Drill Presses.

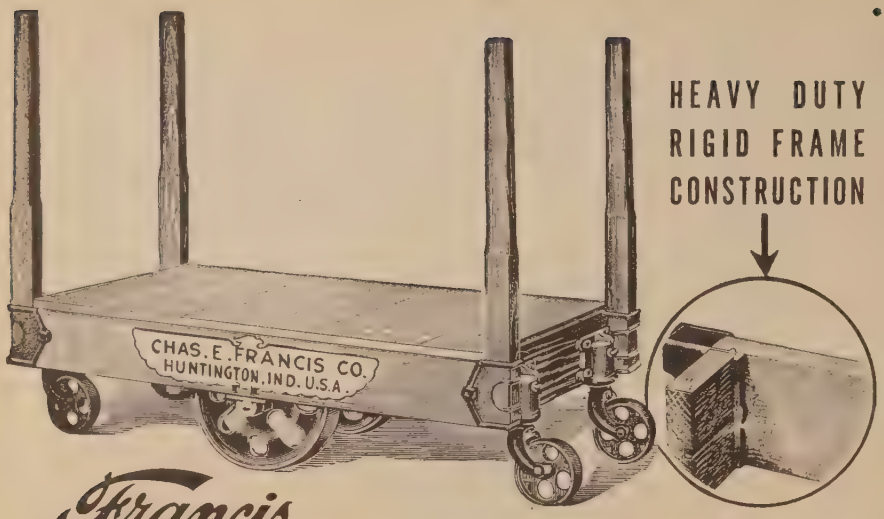
Name.....

Position.....

Company.....

Address.....

City.....(.....) State.....



Francis
EST. 1880.

FACTORY•MILL•WAREHOUSE TRUCKS

These *heavy duty* trucks are made for hard service and rough usage, in two styles and several popular sizes. All iron work is carefully machine-fitted and caster design makes possible heavy loads without binding. One of the finest, most serviceable trucks on the market today. Write for illustrated bulletin and prices.

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DISTRIBUTORSHIPS AVAILABLE
IN MANY LOCALITIES—WRITE FOR DETAILS

CHAS. E. FRANCIS CO.
HUNTINGTON, INDIANA

Faster
Smoother
Cleaner
Grinding

ECONOMY
THE W&B CO.
Lubricant 1888

This easy-to-mix liquid type, water soluble lubricant for grinding and cutting keeps machines clean, wheels open and free cutting—less wheel dressing is required—production is increased.

ECONOMY LUBRICANT 1888 permits the use of finer grit wheels. It gives faster grinding, longer wheel life, cleaner stock removal and better finish.

Write us for specifications and recommendations.

THE WHITE & BAGLEY COMPANY
WORCESTER 8, MASS., U.S.A.
Original Producers of Grinding Lubricant

(Continued from page 280)

emphasis on supervisor training. We believe that many of the programs of the past have been on too broad a discussion basis, and have fallen short of providing specific training in the real skills of the handling and supervision of people as individuals.

"We are now embarking on a multi-phase supervisor training program which provides for each step in the supervisor's development. The new foreman—the one who used to be tapped on the shoulder and forthwith became a foreman—is now given the opportunity to take a well-organized preliminary training course before ever starting on the job in which course he receives the basic training he needs to function as a supervisor. We are convinced that a substantial investment in training time at this point in the supervisor's career is the key to making him more effective in his work and much better received by his workers."

• Flexonics As Science

Flexonics, according to an announcement by the Chicago Metal Hose Corp., Maywood, Ill., is defined as "the science of controlled bending of thin metals for use under varying conditions of temperature, pressure, vibration and corrosion." The coined word has particular reference to the art of manufacturing flexible metal hose. Through application of flexonics, company spokesmen point out, advances have been made in its stainless steel line. A small trademark character, Flexon, is now appearing in all Chicago Metal Hose Corp. advertising.

• Profit-Sharing Program

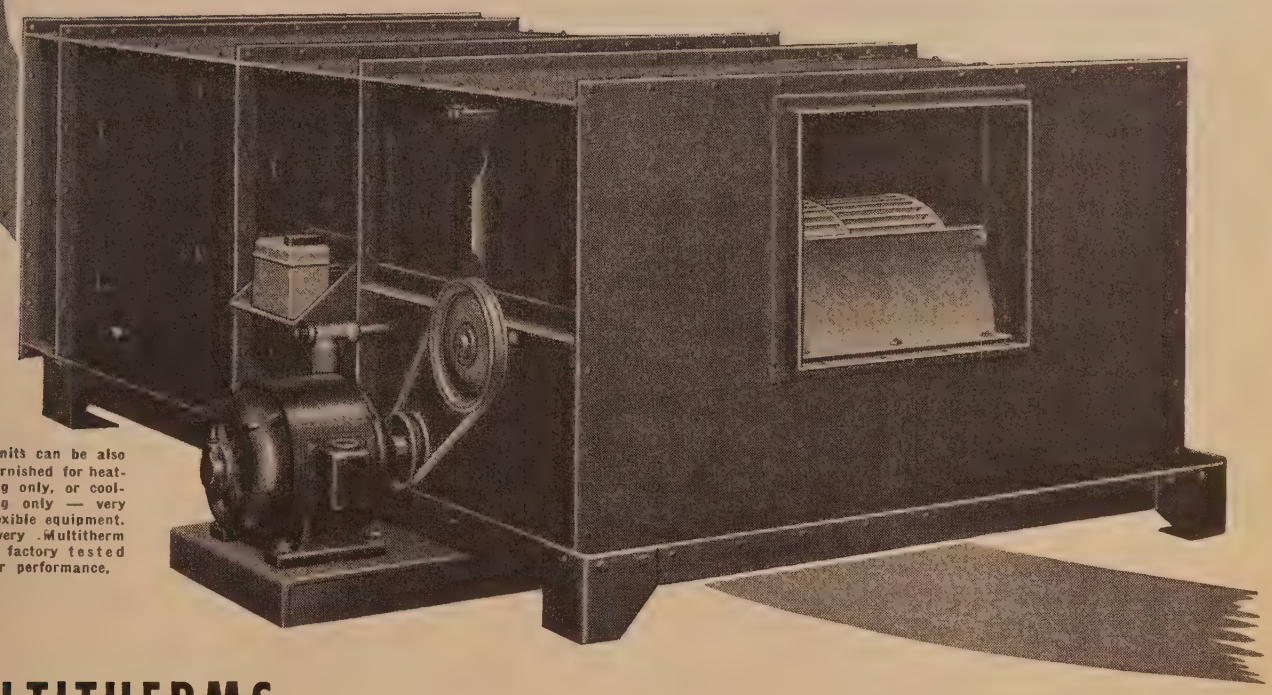
A profit sharing plan in which the company will contribute from 10 to 25% of yearly profits to a trust fund to provide future welfare and security to its members without cost to them was announced on January 25 by Lloyd C. Backart, president and sales manager of The Rapids-Standard Co., Inc., materials handling equipment manufacturers in Grand Rapids, Mich.

Backart announced the plan, the company's third profit sharing program, at a meeting of 300 members of the company and their families in the St. Cecilia auditorium in Grand Rapids.

He pointed out that the new plan will provide life insurance and an-

(Continued on page 284)

HERE'S ONE OF THE MOST EFFICIENT WAYS TO AIR CONDITION!



*Units can be also furnished for heating only, or cooling only — very flexible equipment. Every Multitherm is factory tested for performance.

MULTITHERMS—WHOLE "WORKS" IN ONE ASSEMBLY . . . BUILT FOR ALL SORTS OF INDUSTRIAL AND COMMERCIAL APPLICATIONS

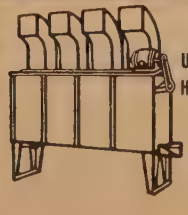
The Clarage Multitherm unit shown above is a complete conditioning plant* . . . (1) it *cleans* the air, removing bacteria, pollen and dust . . . (2) it *cools and dehumidifies* in summer utilizing cold well water, brine or a direct expansion refrigerant . . . (3) it *heats and humidifies* in winter using steam or hot water . . . (4) it supplies at all times a circulation of conditioned air under positive fan pressure.

Multitherms are as easy and inexpensive to install as unit heaters — and just as satisfactory in operation. They may be suspended from the ceiling, mounted on platforms, or installed on the floor. Sizes range from 400 to 13,600 c.f.m. If the job is extra large, it can be handled with two or more units.

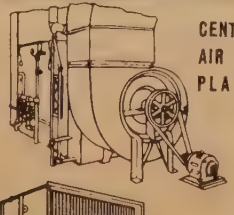
Look into Clarage Multitherms if you have any type of air conditioning problem. They are engineered to give precision results — compact to save space — of heavy duty construction for years of continuous trouble-free service. *And, as compared to central station conditioning, you can usually save considerable money.*

Write us, outlining your requirements — or ask for Bulletin 107 giving complete information.

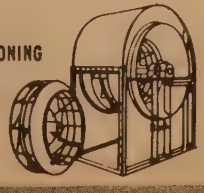
SOME OF OUR OTHER PRODUCTS



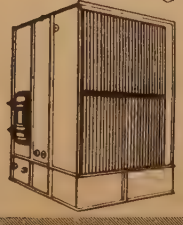
UNIT HEATERS



CENTRAL STATION AIR CONDITIONING PLANTS



AIR CONDITIONING AND VENTILATING FANS



AIR WASHERS

CLARAGE FAN COMPANY
Kalamazoo, Michigan

APPLICATION ENGINEERING OFFICES IN ALL PRINCIPAL CITIES

the SHORTCUT to Faster Production ...and Lower Costs

Marquette "Instant Arc" A.C. Welders . . . the answer to your production problem. On light gauge sheet metal, "Instant Arc Striking" means faster welding because it is so easy to strike and hold the arc. The exclusive A.C. feature of No "Magnetic Blow" saves time and tempers on difficult jobs. Welding eliminates unnecessary drilling, tapping, riveting, etc. and makes a stronger finished product.

Make quick, dependable repairs on vital production machinery without dismantling. The time you save on a single job may pay for your Marquette Welder. Maintenance men find hundreds of uses for versatile Marquette Welders . . . building racks, bins, trucks, etc. Marquette "Instant Arc" A.C. Welders are low in cost three ways . . . Low Initial cost, Low Operation cost, and Low Maintenance cost.

MARQUETTE

Instant arc A.C. WELDERS

Model 262C has Built-In Capacitor for High Power Factor. Telnic Bronze plugs and sockets double current carrying capacity. Special transformer design delivers "Instant Arc Striking" *without* extra high frequency or booster gadgets. Wide welding range of 20 to 275 amperes. Fully Equipped. Models: 262 and 262 C (with Capacitor) 20-275 amps.; 261 and 261 C (with Capacitor) 20-200 amps. 8 additional models from 125 to 400 amps.

MARQUETTE WELDING EQUIPMENT SOLD EXCLUSIVELY THROUGH THE NATION'S LEADING DISTRIBUTORS

MARQUETTE Welding EQUIPMENT

A.C. ARC WELDERS · ELECTRODES
GAS WELDING And CUTTING EQUIPMENT
ACETYLENE GENERATORS · ACCESSORIES

MARQUETTE MFG. CO., INC.
MINNEAPOLIS 14, MINN.

(Continued from page 282)

nuity funds to supplement regular Social Security benefits for members after retirement at 65, death benefits before retirement and payments in the event of disability. All company members are eligible after three years' service.

Rapids-Standard already has in operation regular monthly bonus and Christmas bonus plans in addition to an insurance and hospitalization plan to which the company and members contribute regularly.

Individual company workers participating in the new plan will not contribute other than through intra-company cooperation and production efficiency which will produce company profits available for the plan.

Total expense of the plan will be borne by the company and the trust fund to which profits will be transferred will be administered by a board of five trustees composed of Lloyd C. Backart, James R. Sebastian and Roger S. Calvert from management and Russell Inwood and Albert Gerritsen from production and engineering departments.

For each year of service and for each $100 earned yearly, a company member will receive one share in the yearly profits transferred to the trust fund.

According to Backart, the value of such shares will be credited to each participating member's retirement account. One third of this yearly addition will be used by the trustees to purchase life insurance policies for participating members, and the remaining amount will be invested in government securities.

If lack of Company profits during any year prevents setting aside funds for the trust, already invested funds will be used to keep the members' insurance policies in force, Backart explained.

When a Rapids-Standard member reaches the age of 65, invested funds which will have accrued to his account will be used either to purchase an annuity policy paying a monthly income, or will be paid to the retiring member in installments.

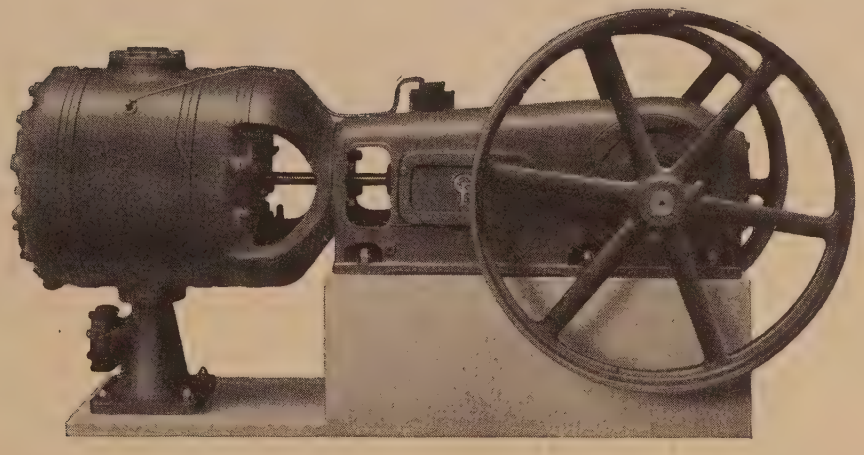
• Fiftieth Anniversary

The Crouse-Hinds Co. of Syracuse, N. Y., is this year celebrating its golden anniversary. A booklet, "Fifty Years", has been published to commemorate the anniversary of the company which was founded January 18, 1897, by Jesse L. Hinds and Huntington B. Crouse to manufacture electrical products. Mr.

(Continued on page 286)

AUTOMATIC WATER RELIEF

protects CP dry vacuum pumps—



• One of the discharge assemblies in each end of the cylinder of a CP Horizontal Vacuum Pump is arranged as a special automatic valve. Should a slug of liquid be accidentally drawn into the cylinder the relief valve assembly will lift off its seat against a heavy spring, providing extra escape area for the liquid and minimizing the danger of damage to the pump. This is an exclusive CP feature.

The durable Simplate Valves are located in both cylinder heads parallel to the piston face, affording low valve clearance and high volumetric efficiency at high vacua.

Arranged for belt, motor or steam drive, CP Single and Duplex Horizontal Dry Vacuum Pumps are available in capacities up to 15,000 c.f.m. Two-stage pumps available for very high vacua. Write for complete information.

CHICAGO PNEUMATIC TOOL COMPANY

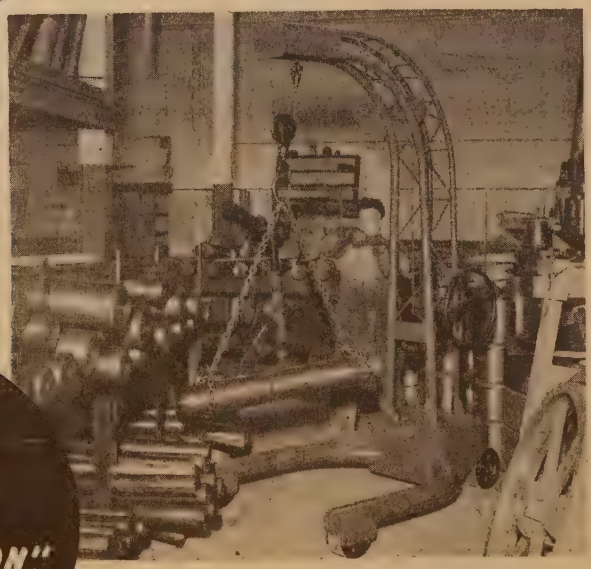
General Offices: 8 East 44th Street, New York 17, N. Y.

PNEUMATIC TOOLS • AIR COMPRESSORS • ELECTRIC TOOLS • DIESEL ENGINES
ROCK DRILLS • HYDRAULIC TOOLS • VACUUM PUMPS • AVIATION ACCESSORIES

YOU MAKE THE COMPARISON!

A TWO MAN JOB...

Stacking heavy material by hand requires two men with double the risk of injury or damage.



ONE MAN- AND A "CANTON" CRANE

The proven way to handle heavy awkward jobs easily, quickly, safely and economically. Eight sizes of "Canton" Cranes handle any load up to three tons.

The HILL ACME Co.

"CANTON" DIVISION • CLEVELAND 2, OHIO

Alligator Shears and Portable Floor Cranes • Also Manufacturers of "HILL" Hydraulic Surface Grinders • "ACME" Forging • Threading • Tapping Machines • "CLEVELAND" Knives and Shear Blades

(Continued from page 284)

Hinds died in 1928 and Mr. Crouse in 1943.

William L. Hinds became president of the company following the death of Mr. Crouse and Huntington B. Crouse, Jr., became vice president. The booklet tells the history of the company and following that lists the employes of the organization, from those with the company less than one year to over 49 years.

• Maytag Management Club

Kenneth Wells, right, of the National Association of Foremen, pins his own NAF badge on Fred Maytag II.

With a charter membership of 214 factory and office supervisors, ranging all the way from job foremen up to the president, Fred Maytag II, a management club has been organized at The Maytag Co., in Newton, Iowa.

More than 95% of eligible management men have their names listed on the charter and the group has affiliated with the National Association of Foremen with headquarters in Dayton, Ohio, and chapters in leading manufacturing concerns all over the United States.

The purposes of the organization as set forth in the constitution, are: improvement of its industrial executives, advancement of industrial management, and promotion of fellowship. Membership is extended to Maytag employes of good character "engaged in the direction of any phase of shop or office management or other work closely related to industrial management."

Carol Curtis, plant processing engineer, was elected president; Cliff Woodruff, foreman in the aluminum foundry, vice-president; Don Talbot, office supervisor in repair parts and service, secretary; and Clarence Griebeling, cashier in the main office, treasurer.

The board of control is composed

(Continued on page 288)

AXIVANE* FANS

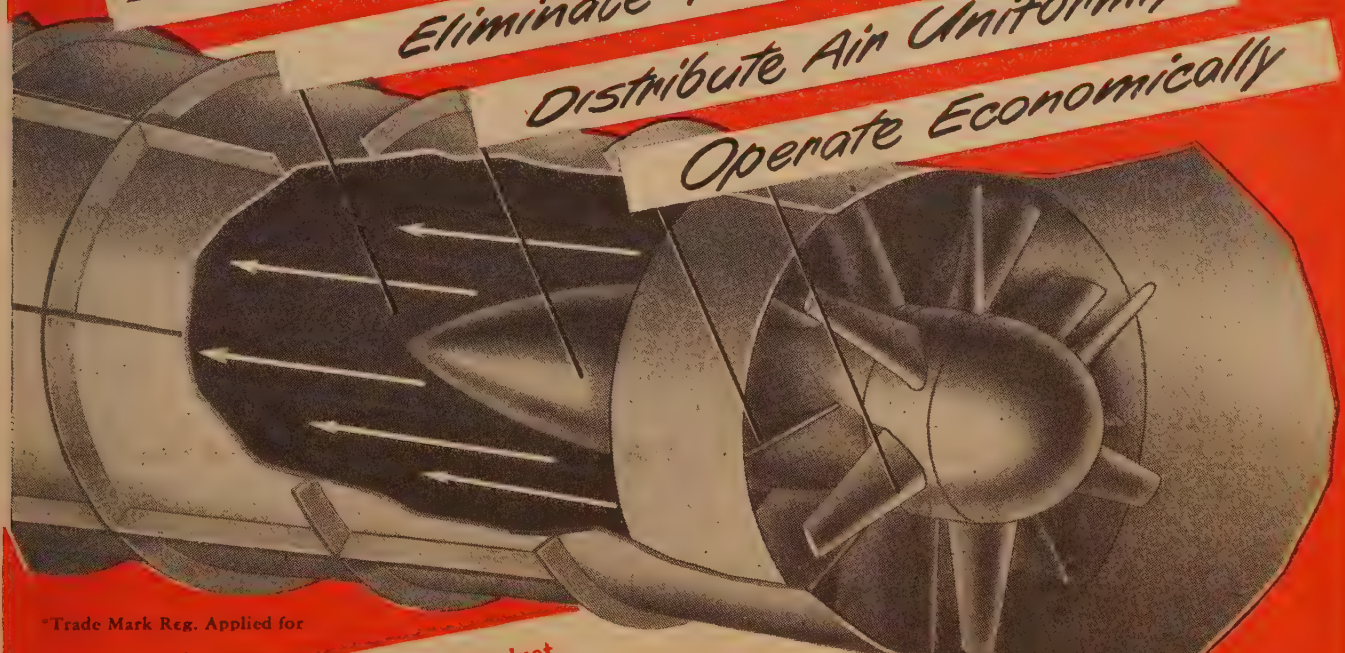
Guarantee Efficiency

LA-DEL FANS – Troller Designed

Eliminate Turbulence

Distribute Air Uniformly

Operate Economically



*Trade Mark Reg. Applied for

Designed to fit any air duct

What's your ventilation or other air-movement job? La-Del Axivane* Fans can do it in less space and with less power—with easy, low-cost installation and quiet, trouble-free operation. ● As the only manufacturer of Axivane* Fans, let our engineers check with yours on futures.

W&D I 418 rev

Consult a Joy Engineer

LA-DEL Division

JOY MANUFACTURING CO.

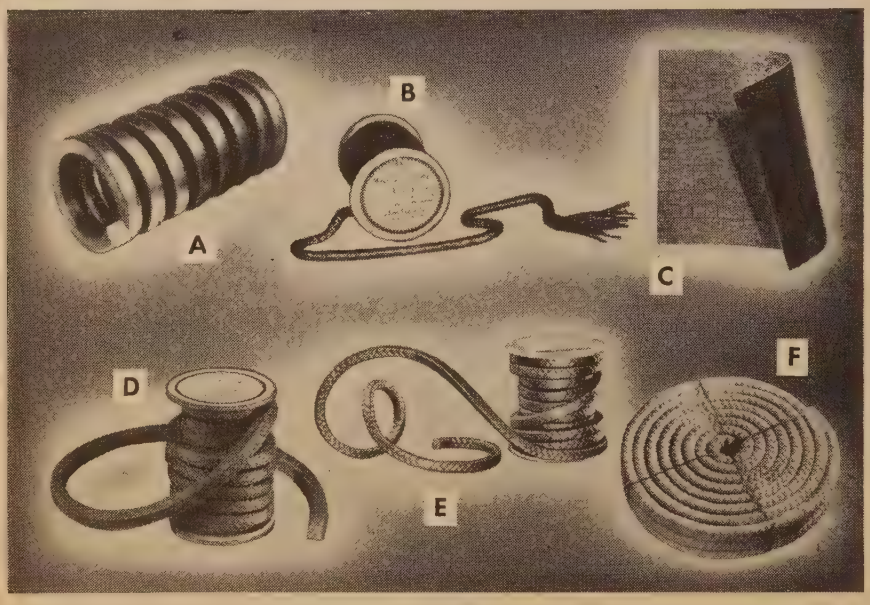
GENERAL OFFICES: HENRY W. OLIVER BLDG. PITTSBURGH, PA.

The sign of a GOOD PACKING

JOHNS-MANVILLE JM PRODUCTS

The J-M Trade Mark is and long has been a familiar sign throughout industry of an effective seal . . . *the sign of a packing that means lower maintenance costs and less shutdown time.*

Here are 6 typical Johns-Manville Packings designed to meet a wide range of service conditions.



A. J-M Kearsarge. A long-wearing rod and plunger packing with a unique folded construction that forms a reservoir for the preserving lubricant.

B. J-M Mogul Packing. For general utility service . . . braided and twisted styles lubricated inside and out for longer life.

C. J-M Service Sheet. A tough, pliable, resilient gasket material with a wide range of applications. Industry's No. 1 sheet packing.

D. J-M Interlocked. A rugged, durable, square-braided packing, without plaits or jackets to loosen . . . for reciprocating and rotating rods.

E. J-M Centripac. Designed especially for packing centrifugal pumps and other rotating and oscillating rods and shafts.

F. J-M Navalon. A newly developed packing for cold liquid service. Contains and retains more lubricant in service; long-wearing, abrasive-free.

See your J-M Packing Distributor or write Johns-Manville, Box 290, New York 16, N. Y.

Johns-Manville PACKINGS & GASKETS

(Continued from page 286)

of P. J. McCloskey, building maintenance supervisor; Dave Mooar, design engineer in the research division; C. A. Staubus, general foreman of assembly; Harry Upton, head of plating and heat treating division; and Harold Wylie, superintendent of foundry division.

With the endorsement of executive management, the organization is off to an enthusiastic start with officers and committees hard at work on an interesting program of educational, inspirational and fellowship meetings. The group holds a dinner meeting once each month and sectional meetings are planned for studying technical subjects of interest to special groups.

The foundation for the management club was laid during the war when a series of informal meetings were held in the interest of stimulating war production. A representative of the National Association of Foremen helped with the formal organization of the new club and field men from the NAF are providing some of the programs. H. J. Post, managing director of the NAF, explained the purposes of a management club at a meeting preceding the organization. Kenneth D. Wells, NAF organization and devolopment manager, was the charter night speaker and presented president Fred Maytag II with his own personal NAF pin. Ray Arduser of the Dubuque Foremens' Club was present to present NAF charter and gavel and to install the officers.

● A New Year's Resolution

Accident prevention - conscious George Schindler, Stromberg-Carlson safety engineer, who distributed copies of a New Year's safety resolution to all foremen and supervisors as a unique means of reminding them of the company's constant efforts to maintain its excellent safety record, was so encouraged at the spontaneous response that he decided to make the printed resolution available to all workers, and published it in the company's house organ, the Stromberg - Carlson *Speaker.*

That the man in the shop saw its merit was evidenced in the overwhelming requests for copies. In 1945 employes of Stromberg-Carlson, which is in Rochester, N. Y., worked a total of 1,070,289 manhours without a lost time accident during the annual New York State three - month accident prevention campaign, and in the last three years

employes of Plant C in Rochester have had a spotless record during the annual drive.

Members of the Rochester Industrial Safety Council applauded Schindler's New Year resolution idea and asked for copies for use in their own plants.

The safety resolution was dated January 1, 1947, and read:

"I hereby resolve to make *Safety* a habit.

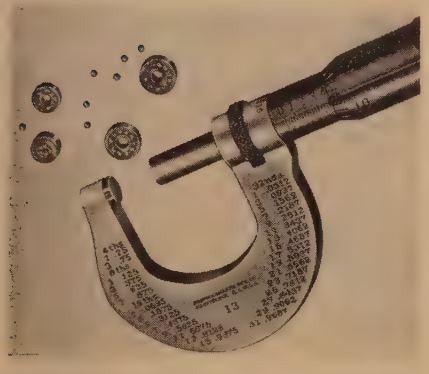
"I hereby resolve to make it my business to see that all employes under my supervision are correctly and completely instructed in how to perform their jobs safely.

"I hereby resolve to study every new machine and process that is assigned to me from the standpoint of safety and not to allow work to start until it can be done safely.

"I hereby resolve to eliminate all safety hazards in my area or, if it is not within my authority to eliminate them, to report them to the safety director.

"Signed: ....."

● Small Bearings Made in Quantity Production



A new plant that will make ball bearings in smaller than standard sizes has located in New Hampshire, it has been announced by the Industrial Division of the State Planning and Development Commission, which recently assisted the New Hampshire Ball Bearings, Inc., originators and manufacturers of the Micro Ball Bearing, to establish a plant at Peterborough.

Founders of this unusual business are Arthur N. Daniels, president and chief engineer, prominent in the development of small ball bearings in the United States, one of whose earlier designs was a part of the Norden Bombsight; and Pierre LeM. Wentworth, vice-president and treasurer, with a background of many years of business and manufacturing experience. Both are veterans with active service in World War II.

(Continued on page 290)

The sign of a GOOD PACKING DISTRIBUTOR

WHEN you need a packing—you'll find, as thousands of others have, that the sign, Authorized Distributor—Johns-Manville Packings—means the right packing for your job . . . and a man who is ready and able to help solve your particular packing problem.

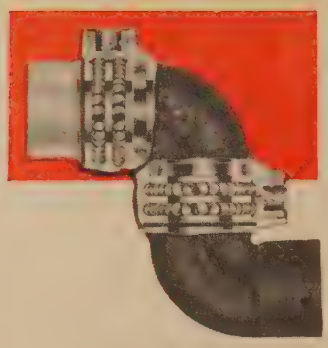
Your J-M Distributor is one of 400 Industrial Distributors who are located in important cities throughout the country and who stock Johns-Manville Packing in many forms and styles. Besides being a convenient supply depot for packing, he is also headquarters for many other industrial supplies. Wherever there's a need for an essential part or tool or material, you can count on him for prompt, efficient service at all times.

Packings For Every Service are available through your J-M Distributor. See him about your Packing needs.

JM PRODUCTS

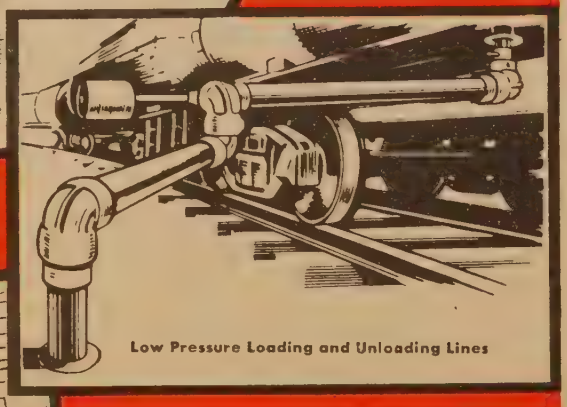
Your **Johns-Manville PACKING DISTRIBUTOR**

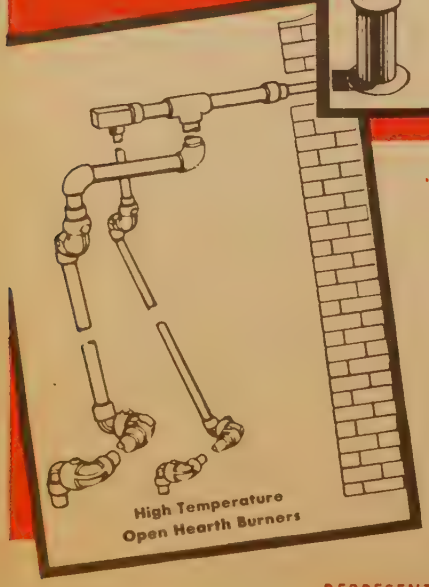
CHIKSAN



BALL BEARING SWIVEL JOINTS

At work





Look around you and you will see CHIKSAN *Ball-Bearing* Swivel Joints at work in many different applications ... from low pressure loading and unloading lines to high pressure hydraulic equipment and under high temperatures on boilers and open hearth furnaces. CHIKSAN Swivel Joints are made in over 500 different Types, Styles and Sizes ... for pressures from 300 psi to 12,000 psi and temperatures to 500° F. ... for full 360° rotation in 1, 2 and 3 planes ... with threaded or flanged ends or bored for welding. Write for CHIKSAN CATALOG No. 45.

REPRESENTATIVES IN PRINCIPAL CITIES
EXPORT REPRESENTATIVE: CHIKSAN EXPORT CO., BREA, CALIFORNIA
Branches: New York 7, Houston 2

CHIKSAN
BALL BEARING SWIVEL JOINTS FOR ALL PURPOSES
CHIKSAN COMPANY
BREA, CALIFORNIA
New York 7 Houston 2

(Continued from page 289)

Mr. Daniels reports that in the comparatively small plant has been assembled the best available equipment for quantity production, testing and inspection of ball bearings, selected after analysis of methods in use throughout the United States; the best of which, where adaptable to these small sizes, were standardized for manufacturing purposes. This represents the first large-scale production of these sizes anywhere in this country. The tiny bearings weigh about 600 to the pound.

Sixty-odd steps of manufacture consist basically of machining bearing rings from high-carbon-chrome alloy steel, solid or tubular stock, on automatic and semi-automatic screw machines, followed by heat treatment with close control of time, temperature, and atmosphere to obtain, through latest metallurgical developments, the optimum in hardness, wear-resistance, and uniformity. The tempered rings, after inspection and test, are ground, lapped and polished, carefully gaged in air-conditioned surroundings, and matched into pairs for assembly and final inspection.

Two general styles, radial and pivot ball bearings, are offered as standard, running from 5/32" to 3/8" outside diameter, for use in the rapidly-expanding field of instruments and compact, high-grade mechanisms. For special purposes, non-magnetic and anti-corrosive bearings in the same general styles and sizes are also available. Prices compare favorably with the larger sizes hitherto considered standard. The plant is expected to employ from 18 to 20 persons.

● Materials Handling Movie

Proclaiming "a new formula for profits," a unique new movie on materials handling—"Payloads Pay Off"—has been released by the Institute of Visual Training.

A three-reel, 26-minute black-and-white sound picture, the new material handling pictorial study features Gregory Abbott, chief commentator for Paramount Newsreel, as narrator. Script was written by Bertram Kalisch, former newsreel editor for RKO-Pathe and MGM and pictorial officer on the general staffs of General Omar N. Bradley's 12th Army Group and General Douglas MacArthur's GHQ.

Produced under a grant from Automatic Transportation Co., Chicago, Ill., manufacturers of electric

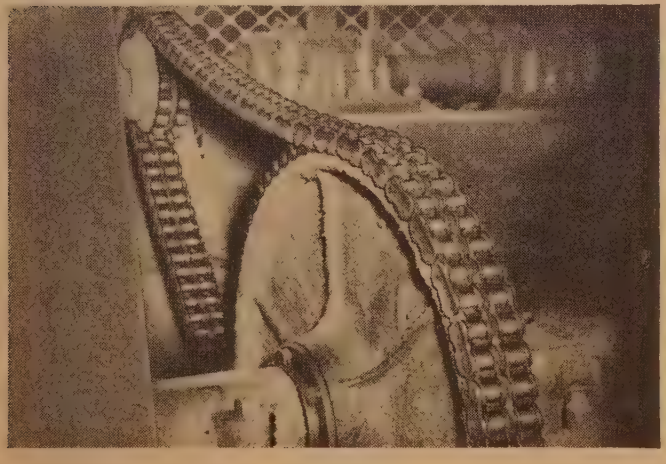
(Continued on page 292)

do you know Roller Chain...

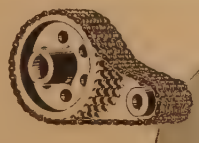
ELIMINATES MORE THAN SLIPPAGE!

① **POSITIVE BALDWIN-REX ROLLER CHAIN DRIVES** not only stop power-wasting slippage, they also eliminate damage to your machines by their inherent elasticity that absorbs shocks and overloads. And, their exceptionally long service life eliminates frequent "time-outs" for repairs and adjustments.

② **I'M NOT JUST TALKING** on that long-life angle. In our product development laboratories, we actually prove the wear-resistant qualities of Baldwin-Rex. This machine, for example, runs the chain over small sprockets at excessively high speeds under conditions considerably more severe than actually encountered to determine life expectancy. In this manner, we get data on materials, heat-treatment, parts design, etc., that mean added service for you.



③ **THIS PLANT** found the exceptionally long life built into every link of Baldwin-Rex Roller Chain a big help in keeping the wheels turning without interruption. Despite repeated shock loading, the drive required very little servicing and no down-time for repairs. You'll find Baldwin-Rex can do the same for you!



You can simplify replacement and chain selection, cut costs, and improve deliveries by buying standard roller chains. Your Baldwin-Rex man will be glad to give you the facts on standard chains and help you with your application problems.

BALDWIN·REX

ROLLER CHAINS

BALDWIN-DUCKWORTH DIVISION OF CHAIN BELT COMPANY

383 Plainfield Street, Springfield 2, Mass.

WITH A

Mall
REG. U.S. PAT. OFF.

PORTABLE ELECTRIC
SCREWDRIVER

CAPACITY: ¼" hex bit up to #10 flat or #12 round head screws.

You can standardize your screw-driving operations, speed up assembly and save real money with this powerful Mall Screwdriver. It is light in weight, (only 3 pounds without cord), compact in design and streamlined with pistol grip and trigger switch for easy, one-hand use. Available in 110-volt AC-DC or 220-volt AC-DC.

MALL TOOL COMPANY
7705 SOUTH CHICAGO AVE., CHICAGO, ILLINOIS
See our advertisement in *The Saturday Evening Post* April 5th issue

WooD PaLLeTs

from the timberlands of LOOKOUT Mountain

Buy the Best—Buy Chattanooga

Selected Hardwoods	**Strength**
Drive Screw Nails	**Durability**
Experienced Workmanship	**A Finished Product**

You'll Find our Quality High—Our Prices Low
Other Wood Products to Specification

CHATTANOOGA FABRICATING CO. INC.
P. O. Box 7026 **Chattanooga, Tennessee**
Kenneth C. McKeown, Pres.

(Continued from page 290)

industrial trucks, "Payloads Pay Off" was filmed with the cooperation of General Electric Co., at whose Pittsfield, Mass., works much of the action was photographed.

Unlike previous material handling movies which have been primarily advertising media for specific equipment, the new film is a dramatization of the science of material handling itself.

It takes its name from the recurring theme: that unit loads of materials efficiently handled with electric equipment are payloads and that such loads pay off in profits for management and upgrading for labor. Through visual study of actual operations—including detailed shots of the control room and equipment at work at the GE Pittsfield plant — the film shows industrial management not only the latest in all types of material handling equipment but also the most advanced methods of using it.

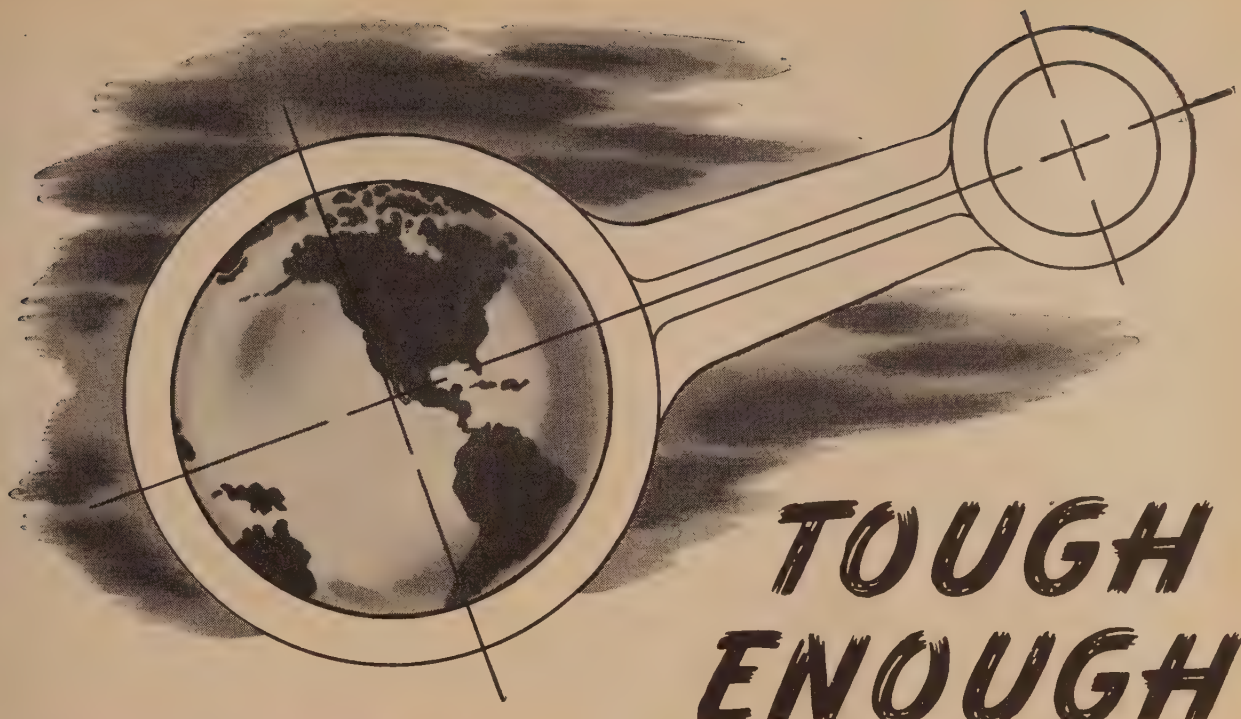
The film will be distributed through the facilities of both the Institute of Visual Training and Automatic Transportation Co. Prints are being furnished to all of Automatic's sales representatives throughout the nation, and screenings may be arranged through them, through Automatic's Chicago headquarters or through the Institute, whose headquarters are located at 40 East 49th St., New York.

It will be available for showings to industrial plants and associations, civic groups, educational institutions and other similar organizations.

● **Valve Company Aids Drive**

Model of power plant, complete in every detail, loaned by Jenkins Bros., valve manufacturers of Bridgeport, Conn., to aid the March of Dimes campaign, was unveiled in Grand Central Station, New

(Continued on page 294)



TOUGH ENOUGH

for any job !

"600" Metal has proved to be the answer to hundreds of problems involving the toughest and most exacting applications during the war. The ever-changing demands calling for bearing alloys that will stand up under increased speed, intensive shock and steady pounding have greatly widened the fields of application for "600" Metal.

Among the list of users of "600" Metal are leading manufacturers of electrical equipment, pumps of all types, engines and other power units, aircraft, automotive equipment, machine tools, control apparatus, ships and marine hardware, packaging machinery and many others.

"600" Metal is available in the form of rod, forgings and tubes. Unlike many other alloys, "600" Metal has a consistent, uniform grain structure in rod of large as well as small diameters.

Primarily where a bearing is subjected to a reciprocating motion, reduction in weight is essential to keep vibration at a minimum and to assure maximum efficiency. Because "600" Metal is stronger per unit of weight, parts can be made of equal strength out of "600" Metal with a REDUCTION OF 10% TO 35% IN THE WEIGHT OF THE FINISHED PART.

"600" Bearing Metal has superlative bearing and non-corrosive properties, and although it contains no tin, it fulfills the same services.

Write us if you have a bearing problem. "600" Alloy may be the very solution. Complete literature is available.

Specify 600 Metal!

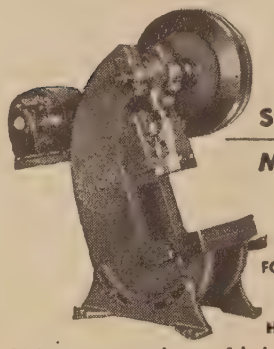
600
BEARING METAL

MUELLER BRASS CO.

PORT HURON, MICHIGAN

Benchmaster's* Improved Model

4-TON CAPACITY BENCH PUNCH PRESS



*World's largest manufacturer of small presses.

SMALL IN SIZE

MIGHTY IN PERFORMANCE

FOR STAMPING, MARKING, PUNCHING, RIVETING, FORMING AND OTHER HIGH-SPEED OPERATIONS

Light, compact and powerful, the improved, post-war Benchmaster 4-Ton Capacity Punch Press offers performance formerly found only in far larger models. Its unusual and exclusive features include a cradle base that allows the press to be inclined; a precision-ground shaft keyed by a press fit to a large eccentric to provide shock-absorbing bearing surface, bronze bushings at all wear points, a single trip action that may be made to repeat rapidly by removing a screw located in the collar, automatic knockout, an open back so that work may also be inserted from the front, a new-type floating motor mount which maintains proper tension of the V-belt, standardization of parts for quick, easy interchangeability and many other typical Benchmaster improvements.

For full information about this new Benchmaster Punch Press and other quality Benchmaster machine tools, write to Dept. MF-3.

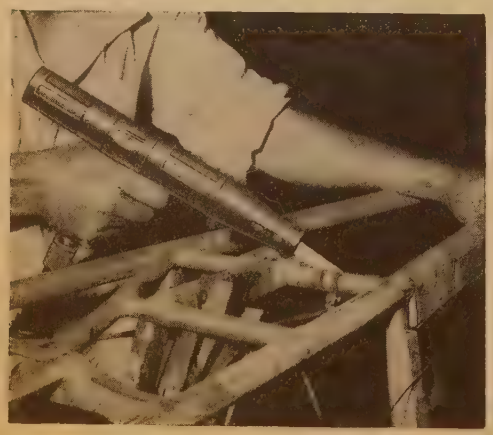
SPECIFICATIONS:

Weight, 215 lbs.
Height, 27"
Die space, 5¾"
Center of bolster plate to frame, 3⅜"
Bolster plate, 6" x 8" x 1" with 2" hole in center
285 strokes per minute with 1725 R.P.M. electric motor
1" stroke standard
Other strokes up to 2" special

benchmaster MANUFACTURING COMPANY
2932 WEST PICO BOULEVARD
LOS ANGELES 6, CALIFORNIA

Air-Speed Trade Mark

CUT JOB COSTS



IDEAL FOR MAINTENANCE AND REPAIR WORK

POWERED BY AIR:

Air-Speed Saw and File eliminates slow, expensive, hand hack-sawing or hand filing. Gets in awkward spaces with ease. Speeds tough filing or sawing jobs on plastics, iron, steel, copper, aluminum, brass, wood, hard fibre and other materials. Air-Speed is designed for one hand operation. Cutting speed is variable—Simple finger pressure adjusts the exact speed required. Only two moving parts assure long life. A "must" for every mechanic.

RUGGED ! LIGHT ! COMPACT !

Weighs only 3½ pounds. ¼" to 1¼" stroke. Grips all hack saw blades and long, short, odd shaped files. Retails for $44.50. Immediate deliveries.

Buy from your Air-Speed Dealer

For Literature Write: Dept. M.F.-14

AIR-SPEED TOOL COMPANY
1500 W. SLAUSON AVE., LOS ANGELES 44, CALIF.

(Continued from page 292)

York January 21. Photo shows A. J. Yardley, left, executive vice president of Jenkins, turning over a check to Irving Haim, chairman of the Greater New York 1947 Fund Raising Drive.

● New Sales Organization

W. Miller Cook

A new sales organization known as W. Miller Cook Associates, Inc., was established recently with headquarters at 1962 Union Commerce Building, Cleveland 14, Ohio. A wide diversity of products made by various rubber manufacturers will be sold on a nation-wide basis. Included in the list are molded, extruded, lathe-cut, rubber-to-metal, hard and soft rubber, molded sponge rubber parts and semi-pneumatic tires.

W. Miller Cook, president of the new company, was formerly vice-president in charge of general sales of the Ohio Rubber Co. where he had served in various capacities for more than 27 years. Mr. Cook has been an active member of the Rubber Manufacturers' Association for 25 years and has served as chairman of the molded, extruded, lathe-cut and chemically blown division of that association for about seven years.

● Comments on Welding Standards

"Anyone following the standards and discussion covering arc welding electrodes and techniques cannot help but wonder. Here is a process that has been used in billions of cases for every imaginable purpose over a generation, whose record has been almost perfect, yet it is criticized and limited more than any comparable process in all mechanical history. The criticism is not because of failure, as there is none. The criticism is entirely in the region of theory covering conditions which could never occur in commercial application.

(Continued on page 296)

MONORAIL PAYS!!

PRODUCTION INCREASE
From 26 to 48 tons per day

By furnishing definite overhead routes for the movement of bar stock, congestion was eliminated. Free flow of materials to production machines nearly doubled their output.

HANDLING COST
Saving of $150 in 4 months

Transfer of sheet metal from truck to storage is costly when handled sheet by sheet. A simple system such as this actually saved $150 in handling cost within four months.

TIME SAVED
Drying time reduced 70%

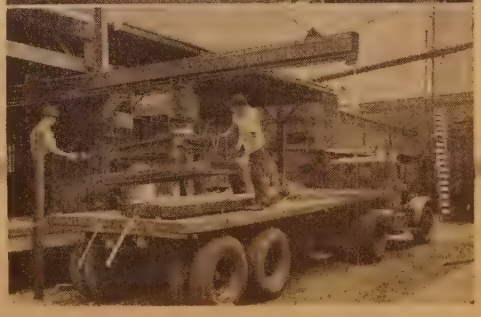
Passage of metal furnace parts through infra-red dryers cuts 70% from the time formerly required for drying. This operation on monorail also eliminates costly handling labor.

INCREASED CAPACITY
30% more units moved through process

Nearly a third more units can be handled from tank to tank throughout the cleaning process. All handling is controlled from cab by a single operator.

LABOR SAVED
Unloads truck with 26 less man hours

Operators claim to save $20 per truck over former unloading costs. With power operated equipment and special grab for handling 2-ton loads, complete safety is assured.

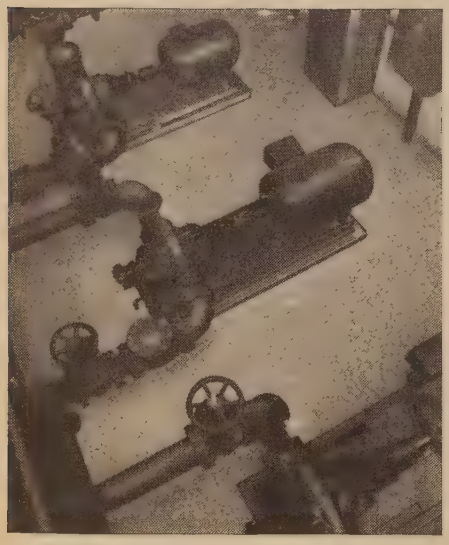


Let an American MonoRail Engineer explain how similar savings can be made in your handling methods. Write for Bulletin C-1 showing successful applications.

THE AMERICAN MONORAIL COMPANY

13101 ATHENS AVENUE CLEVELAND 7, OHIO

PUMP NOTES by DEMING



"SPECIAL" PUMPING JOBS ARE OFTEN "STANDARD"

"SPECIAL" pumping jobs do not necessarily indicate the need for "special" pumps.

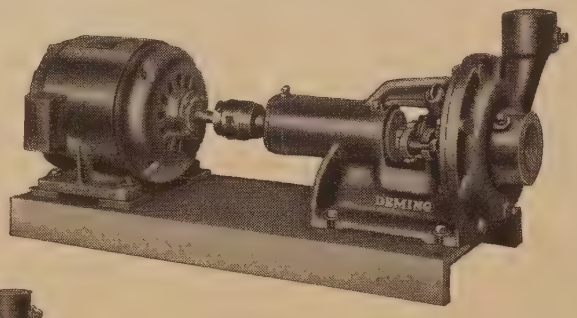
In numerous cases on record, Deming Pumps of standard design and construction are giving high standards of performance under conditions which the owners had good reason to think were "specialized" pumping jobs.

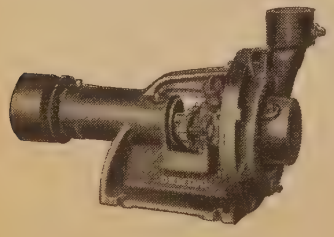
For example, the *standard* line of Deming Side Suction Centrifugal Pumps includes so many types and capacities that actual needs for a "special" pump are reduced to a minimum.

Two of many types of *standard* Deming Centrifugal Pumps are illustrated.

Illustration at right shows Deming Fig. 4003-M Side Suction Centrifugal Pump, direct connected to Electric Motor. Two ball bearing type with adjustable semi-enclosed impeller.

Illustrated below is the Deming Fig. 4003 equipped with a combination pulley suitable for either flat or "V" belt drive.





NEW BULLETIN NO. 3900-B

Write for a copy of this new, 8-page, 8½ x 11, illustrated bulletin which includes exterior and sectional views of single and two ball bearing types of Deming Centrifugal Pumps, ½", ¾", 1", 1½", and 2" side suction. Performance tables on Belt Driven and Motor Driven units are included in Bulletin No. 3900-B. Write for a copy.

DEMING DISTRIBUTORS LOCATED EVERYWHERE

Close cooperation between Deming field engineers and Deming Distributors makes a hard-to-beat combination of sales-engineering "know-how" to serve your pumping needs. If you don't know where to locate the nearest Deming Distributor, write us.

THE DEMING COMPANY • 196 BROADWAY, SALEM, OHIO

DEMING
INDUSTRIAL PUMPS

(Continued from page 294)

"Anyone who views the situation objectively cannot help but wonder whether the people writing such standards and making such researches can possibly be serious.

"There is one controlling fact regarding welded structures which, from a practical point of view, makes all of this activity nonsensical. That fact is this—in the case of mild steel, which embraces more than 95% of all the welding which is done, the welded joint is very much stronger and has a very much higher elastic limit than the plates joined.

Tensile specimen containing welded joint with abundant surface porosity. Plate failed at 59,1000 psi.

"Since that is true, the weld can never be used in actual service at anywhere near its point of failure. As a mattter of fact, in actual application if the welded structure should be loaded to a point which would even approach the elastic limit of the welded joint, or the metal immediately adjacent to the weld, the structure itself would be useless.

"Perhaps we can illustrate the matter this way—supposing there is a chain of 100 links, each link being made of 1" round, 99 of these links being made of mild steel and one link made of high strength alloy steel. Then suppose the chain was tested. Would anyone worry about the chain breaking in the one alloy link? He would not, because every one of the other 99 links would break long before the alloy steel link was even partially loaded.

"Exactly the same thing is true of a welded structure. The weld itself and the metal immediately adjacent to it has an elastic limit 50% above that of the parent metal and has ultimate tensile strength at least 20% greater. If the strength of the rest of the structure is sufficient certainly the weld must be. As a matter of fact, structures are designed with a factor of safety so that at its maximum load the structure would not be up to one-half of

(Continued on page 298)

Furniture Builders are "Sitting Pretty"

AND SO ARE THEIR CUSTOMERS...

...when Costs are Cut — Appearance and Durability improved — by AMERICAN PHILLIPS SCREWS

IN THE FACTORY: The most modern fastening for all types of furniture is the American Phillips Screw. Easy to handle . . . lightning-fast and automatically straight to drive . . . fumble-proof, slip-proof and damage-proof . . . American Phillips Screws deliver top savings on any fastening job in any type of plant from furniture to railroad cars. Put these engineered screws on *your* costs — *and watch your time-savings shoot up as high as 50%!*

IN THE SALESROOM: One of the hallmarks of fine furniture and other household appointments is the decorative, straight-set, unburred head of the American Phillips Screw. More and more quality-minded buyers look for this distinctive feature—*both* for the sake of appearance, and as a *visible assurance* of sturdy construction and long service—their money's worth and then some! *Your* product should have this cost-cutting, sales-building advantage.

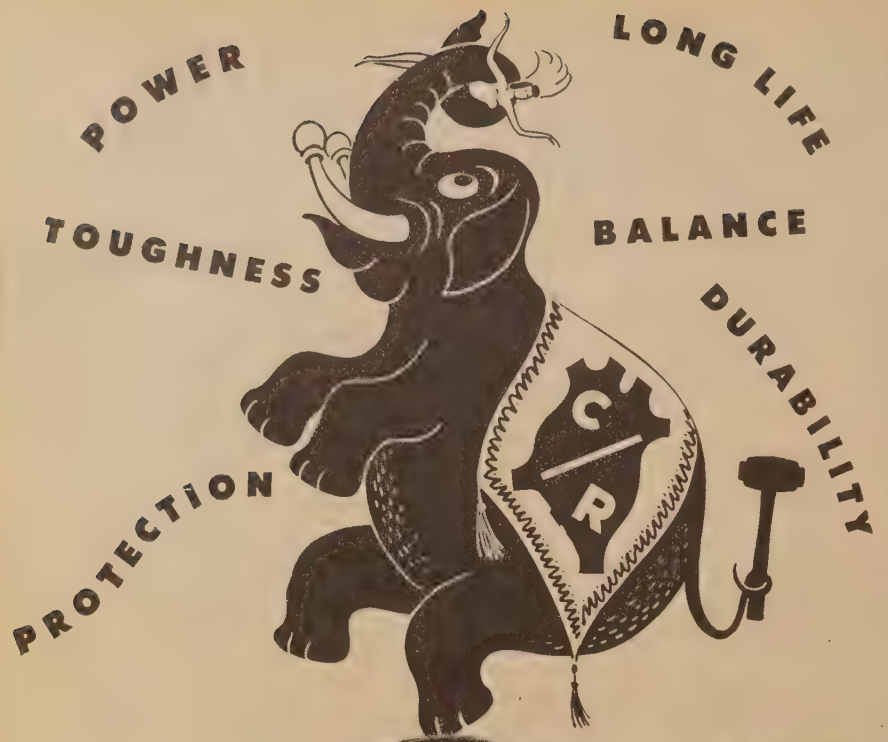
4-WINGED DRIVER CAN'T SLIP OUT OF PHILLIPS TAPERED RECESS

AMERICAN SCREW COMPANY, PROVIDENCE 1, RHODE ISLAND

Chicago 11: 589 E. Illinois St. *Detroit 2:* 502 Stephenson Bldg.

AMERICAN PHILLIPS *Screws*

ALL TYPES
ALL METALS: Steel, Brass, Bronze, Stainless Steel, Aluminum, Monel, Everdur (silicon bronze)



C/R Hammers have malleable iron heads with replaceable coiled rawhide faces.

RAWHIDE . . . that's the material which gives you *everything* you want in top grade "soft" hammers and mallets. And *Chicago* means the best in Rawhide. C/R mallets and hammers are made from resilient, tightly coiled rawhide. They absorb shock, deliver powerful blows yet protect delicate machinery and surfaces, and stand up under continuous hard use. They do not split, crumble, or mushroom. Whenever you need durability, power and safety, always specify *Chicago* Rawhide hammers and mallets.

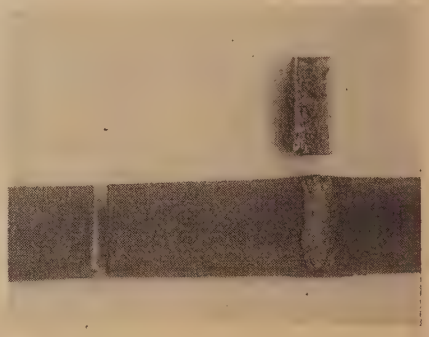
CHICAGO Rawhide MFG. CO.

1215 ELSTON AVENUE CHICAGO 22, ILLINOIS

Other C/R maintenance products are: round, flat and twist belting; belt pins and belt lacings; gears, pinions and gear blanks; aprons and hand leathers; hydraulic packings.

(Continued from page 296)

the elastic limit of the parent metal. Obviously, it would not be stressed to more than one-third of the elastic limit of the weld metal and the plate immediately adjacent to it. Using our illustration, why do we worry about the alloy steel link when the mild steel chain is not loaded to its yield point?



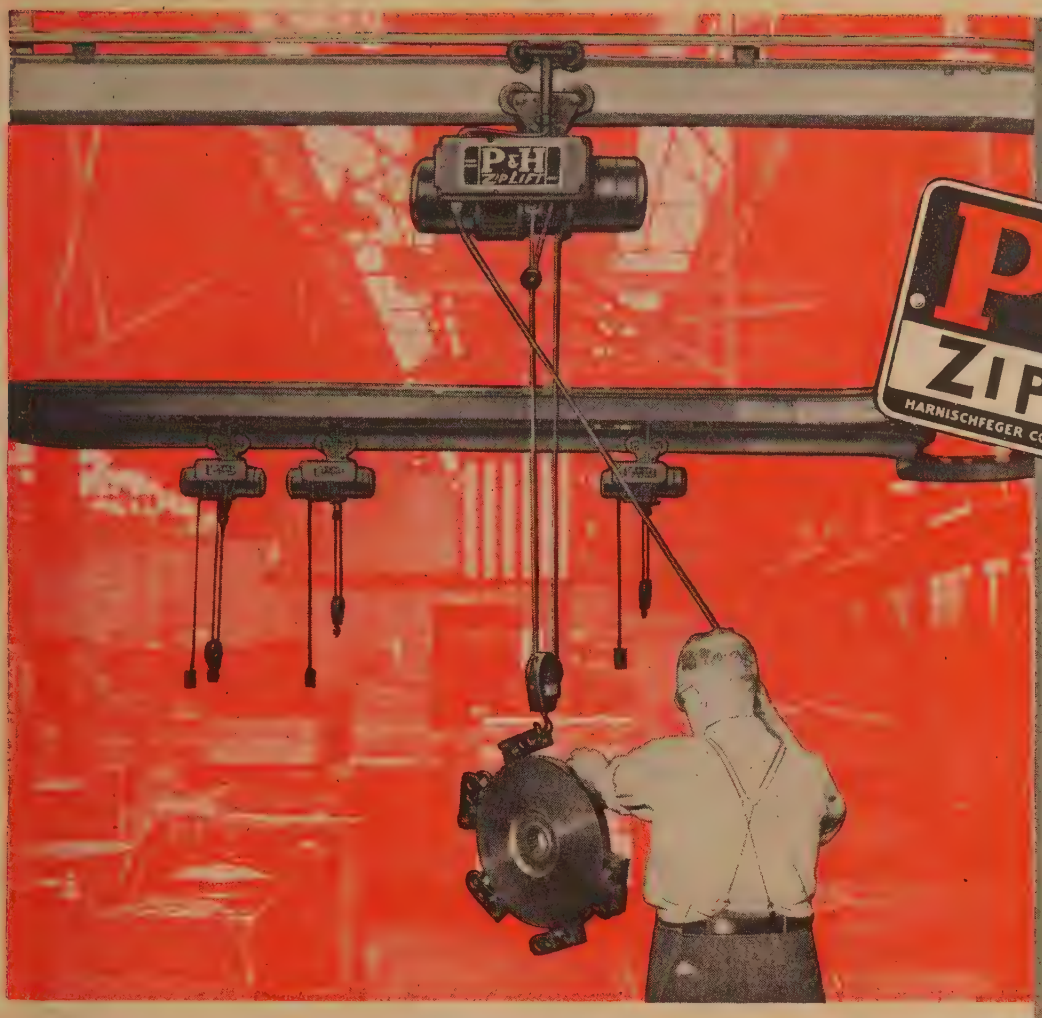
Tensile specimen containing welded joint which has abnormally large amount of internal porosity. Plate failed at 62,500 psi.

"Because of this program of criticism, great and unnecessary expense is put upon the manufacturer using welding. This, of course, is paid by the buyer in higher prices. No reason nor any possible return accrues to the user. There are countless illustrative cases that could be cited; the following are examples. If there is surface porosity, even so much as a little hole on the surface, the weld is rejected. If that same little hole were below the weld surface where it could not be seen, the manufacturer must cut it out carefully and *re-weld the joint,* at great expense, after finding it with expensive x-ray. Again, if there occurs slight undercutting at the edge of the weld, the weld must be re-welded and the slight undercut eliminated.

"Perhaps we could understand such rules if they were not made by engineers who obviously know the facts. However, all such rulings are made by men who insist they are expert in the profession of arc welding. Hence, the conclusions are not based on ignorance.

"While the accompanying photographs show facts that are well known to all those who are versed in the art, they are shown again to bring out the obvious facts. Here is the proof of all the above statements regarding the efficiency of welded seams with so-called defects. Here is porosity carried to the greatest extreme that skill can take it, yet the joint is stronger than the plate. Here is great undercut and

(Continued on page 300)



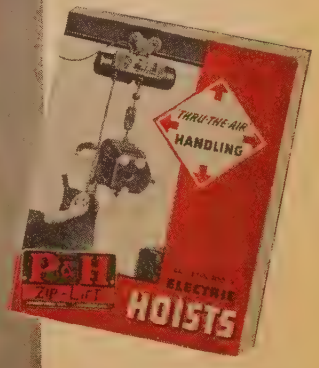
PRODUCTION NEVER PAUSES

when parts come THRU-THE-AIR!

No sooner is one part lowered into place than the next is on its way. Traveling "thru-the-air" via Zip-Lift Electric Hoist, it moves quickly and directly into position. And this with no effort by the operator save the mere pushing of buttons!

That's the beauty — and *economy* — of handling materials "thru-the-air." There's no waste effort, no delay, no loss of valued floor space. Best of all, "thru-the-air" handling lends itself to many different operations, even to carrying the load from the raw material stage right on through to the finished product!

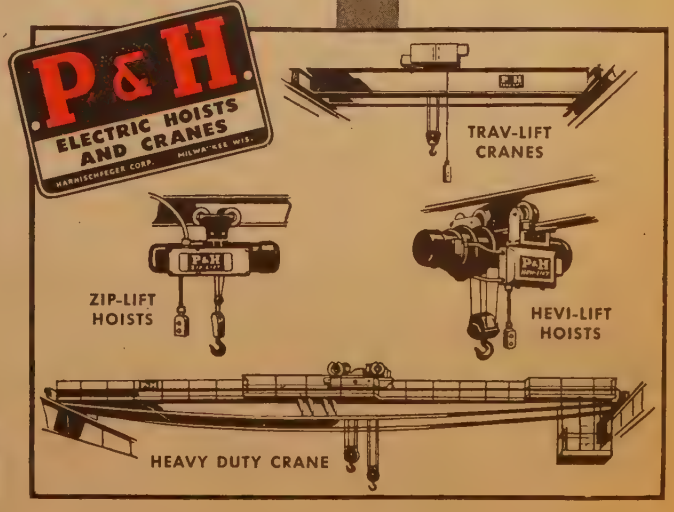
Your inquiries are invited



Here's everything you want to know about P&H Zip-Lifts . . . applications, pictures, specifications. It's Bulletin H20-3—yours for the asking.

the "Extras" are standard equipment, added values on P&H Zip-Lift Hoists

- Shaved gears for lifetime service . . . all bearings grease-sealed.
- Motors specifically designed and built by P&H for hoist service — high starting torque, frequent reversal, etc.
- Effortless push-button control . . . equally effective on hook, jib, or trolley operation.
- Transformer provides 110 volts at the push button.



P&H

ELECTRIC HOISTS

4565 West National Avenue
Milwaukee 14, Wisconsin

HARNISCHFEGER CORPORATION

HOISTS · WELDING ELECTRODES · MOTORS · P&H · EXCAVATORS · ELECTRIC CRANES · ARC WELDERS

PREVENT this downtime

by cleaning floors the OAKITE way

WHEN you keep your mill floors clean, film-free, non-slippery, you not only promote underfoot security for your employees, but also speed plant traffic.

Carpet of Safety

One easy way to keep floors free from oil, moisture, grease and other slippery deposits is to sprinkle that highly absorbent material, Oakite Composition No. 71 over areas to be treated. This granular material immediately soaks up all moisture so that floors are left thoroughly clean, safe to walk on.

Get Complete Story!

Oakite Composition No. 71 is remarkably economical, easy to use and fire safe. Details are yours for the asking. Write for further information today.

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Technical Representatives in Principal Cities of U. S. & Canada

OAKITE
REG. U. S. PAT. OFF.

Specialized Industrial Cleaning
MATERIALS • METHODS • SERVICE

(Continued from page 298)

even laps in the weld that still break the plate in tension. Not only would such joints be rejected, but if they had 1% of these so-called defects the structure itself would be rejected. The question naturally is asked, 'Why?'

"It is perfectly obvious that there could not possibly be a riveted joint which could join any of these pieces of steel together in any way which in tension would not break, yet there is no testing of the rivets,

Tensile specimen containing weld with abnormal amount of undercut. Plate failed at 59,400 psi.

no x-ray of the voids in their joint, no elimination of the undercut, yet we know in every riveted joint that all of these defects are present not only occasionally, but in every case. Again we ask the obvious question, "Why accept such defects in a riveted joint and reject them in arc welding with its greater strength, ductility and soundness?

"Engineering has contributed to America's prosperity in an unbelievable way, but I tremble to think what would occur to our prosperity if all engineering were as remiss in its understanding of the problem as is true of many engineers' attitude toward electric welding.

"There is no doubt that if the foolish restrictions, which can add nothing whatsoever to the success of any welded joint, were removed, the cost of welding those structures could be reduced by as much as 90% in many cases, yet because of these restrictions, concurred in by many engineers, the industry paid hundreds of millions of dollars in additional costs over the years with no increase in safety and no betterment of the product from any point of view.

"These same restrictions still stand and are being rapidly amplified. There can be no doubt that their presence is not the result of engineering judgement. It is impossible to believe that can be true. There can be only one reason and

(Continued on page 302)

Penco

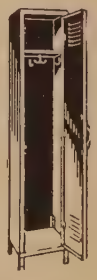
steel storage equipment

Reduces Loss

Caused by fire, vermin, dust, and theft.

For the permanent protection of tools, parts, assemblies, personal clothing and supplies of all kinds, replace makeshift facilities with *new PENCO Steel Storage Equipment.*

LOCKERS



- Help maintain employee morale.
- Provide for safe, sanitary storage of clothing and personal effects.
- Help promote orderly "factory-keeping."

CABINETS

Tool and Storage

- Time-saving and convenient machine tool accessories.
- Efficient storage for tools, parts, gauges, instruments, supplies.

SHELVING

- Provides for controlled handling and storage of tools, parts and assemblies.
- Simplifies storekeeping.
- Reduces losses and breakage.
- Saves floor space — allowing extra room for productive purposes.

1869 Penco FOR PERMANENCE

Write for Catalog and free engineering service. Kindly state the type of equipment required.

Penn Metal Corporation of Penna.
In Business Continuously Since 1869
L. LEWIS SAGENDORPH, *Founder*, 1869-1909
66 Oregon Avenue, Philadelphia 48, Pa.

CUTTING TOOLS

$54,000,000 worth of cutting tools—thousands of types—are immediately available to those in the metal working industry who act quickly. The offering includes: cutting tools for machine tools, metal turning tools for metal turning machines, accessories and attachments for machine tools, and tool room specialties, all sizes and types. This entire inventory is being sold on sealed bids and will go at bargain prices to those who inquire—inspect—invest. Get full particulars from your nearest WAA Regional Office today—see the tools you wish to buy—then submit your bid.

Sales of Cutting Tools will be held at frequent intervals. To receive information on future sales, write to the Regional Offices listed below asking that your name be placed on their mailing lists.

BOSTON • PHILADELPHIA • CINCINNATI • CHICAGO
CLEVELAND • DETROIT • ST. LOUIS • LOS ANGELES

OFFICE OF GENERAL DISPOSAL

WAR ASSETS ADMINISTRATION

GOVERNMENT WAA SURPLUS

Offices located at: Atlanta • Birmingham • Boston • Charlotte • Chicago • Cincinnati • Cleveland • Dallas Denver • Detroit • Fort Worth • Helena • Houston • Jacksonville • Kansas City, Mo. • Little Rock Los Angeles • Louisville • Minneapolis • Nashville • New Orleans • New York • Omaha • Philadelphia Portland, Ore. • Richmond • St. Louis • Salt Lake City • San Antonio • San Francisco • Seattle • Spokane • Tulsa

1022

Easy Lifting . . . by hand

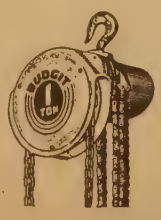
When you have lifting jobs to do and must do them manually, you can do them easier, quicker, and more economically with 'Budgit' Chain Blocks because they convert more of man's effort to useful work. They're the most efficient hand hoists there are.

Their high efficiency comes from their modern design (the first new design in chain blocks in 50 years) anti-friction bearings throughout, and all working parts, including the automatic load brake, operate in grease in a sealed housing.

'Budgit' Chain Blocks are one-man hoists. One man can lift carry, and hang up the largest size with which he can lift two tons.

Get complete information about the advantages of 'Budgit' Chain Blocks from our distributor in your locality or send for Bulletin No. 367.

'Budgit' Chain Blocks come in sizes to lift loads weighing up to ¼, ½, 1, and 2 tons. Prices start at $59.50.



MANNING, MAXWELL & MOORE, INC.
MUSKEGON, MICHIGAN

'BUDGIT' *Chain Blocks*

Builders of 'Shaw-Box' Cranes, 'Budgit' and 'Load Lifter' Hoists and other lifting specialties. Makers of Ashcroft Gauges, Hancock Valves, Consolidated Safety and Relief Valves and 'American' industrial instruments.

(Continued from page 300)

that is a studied attempt by some people to discredit this tremendously valuable manufacturing process which contributed more to the winning of the war and to the production of a standard of living than almost any other recent mechanical development. Such a program must be stopped."

J. F. Lincoln, President
The Lincoln Electric Co.

● Publishing Plant

Construction is already under way on an addition to the Philadelphia Inquirer which will add approximately 720,000 sq. ft. to the physical property of this and other Triangle publications. The expansion program will give the Inquirer and its affiliated periodicals a three-block frontage on North Broad Street, Philadelphia, and special design features will place the completed project in the front rank of American publishing facilities.

Such advanced features as a helicopter landing base for newspaper pickup and delivery, and television and broadcasting towers are within the scope of the project designed by Albert Kahn Associated Architects and Engineers, Inc.

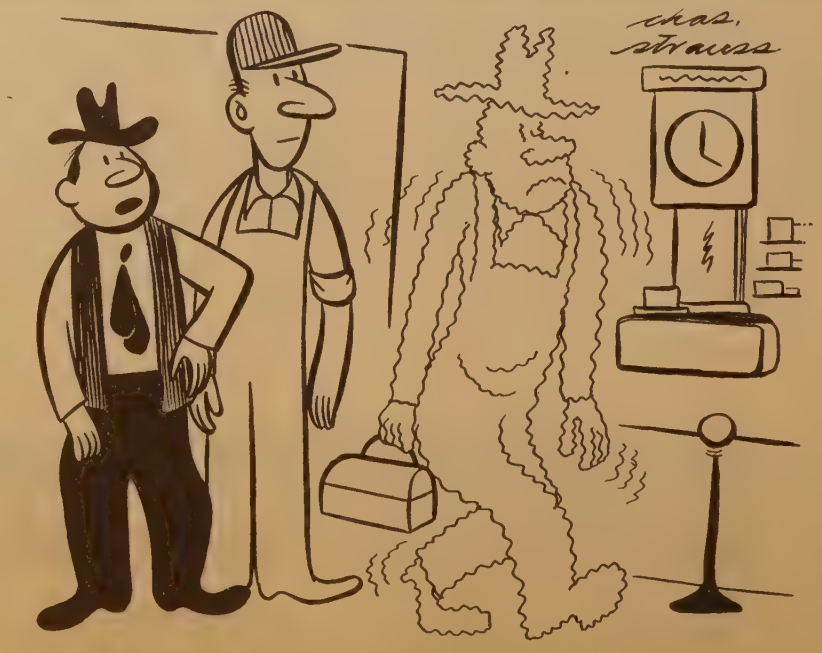
Principal operation to be housed in the addition under way is a rotogravure press room to house a maximum of 140 press units, cylinder and film processing departments as well as a large bindery, for production of various Sunday Inquirer feature sections and numerous national magazines, ranging from "Gags" to "Seventeen", produced by Triangle Publications, Inc.

Two city blocks immediately north of the present Inquirer property were acquired for the addition, and permission was obtained to close intervening Hamilton Street, thus creating a super block. A separate parcel was also obtained immediately to the west across 15th Street for a company garage and service area which will connect with the rotogravure plant by tunnel beneath the pavement.

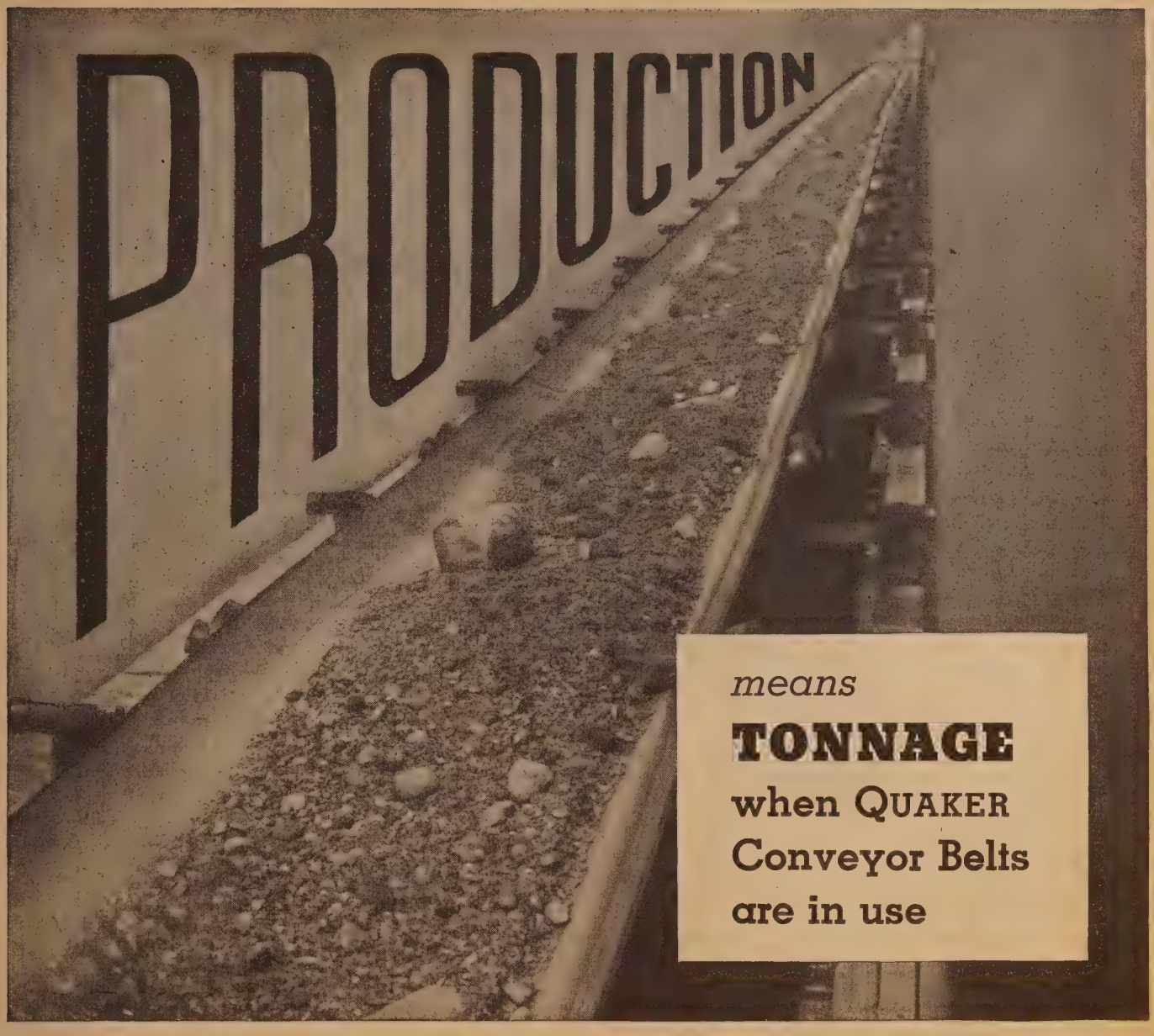
The addition now going up is 310 ft by 353 ft with two basement levels and two upper floors surmounted by a tower 118 ft above street level. This tower contains fan rooms and cooling equipment, and a solvent recovery area, and serves architecturally to balance the existing office tower.

Two bridges connect the existing building with the addition, each with a pedestrian passage-way and conveyors to move paper from storage area in the new structure to the newspaper press room in the existing plant. The expanded section will be utilized for creation and

(Continued on page 304)



"Better take Murphy off that pneumatic drill tomorrow."



QUAKER Conveyor Belts

Quarries depend on rubber conveyor belts to deliver big tonnage, and when you specify QUAKER and install these Quality Belts you can look forward to their handling thousands and thousands of tons of sand, gravel, crushed stone, cement and kindred products.

Quaker Belts are manufactured of American-made rubber for the covers and friction; carcass is of high grade duck and turned out under the supervision of highly trained technical, experienced belt workers.

Quaker manufactures a complete line of industrial Rubber Products that are so needed and used in and around quarries. Belting; Hose for air, water, suction, fire protection, steam, etc.; Rod and Sheet Packings; Gaskets; Pump Valves, etc.

It is good policy to keep on asking for Quaker . . . the name that stands for Quality Industrial Goods.

QUAKER RUBBER CORPORATION

PHILADELPHIA 24, PA. • NEW YORK 7 • CLEVELAND 15 • CHICAGO 16 • HOUSTON 1
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REG. U. S. PAT. OFF.

For Long, Accurate Cutting...

SPECIFY
MILFORD
FLEXIBLE BACK
METAL-CUTTING
BAND SAW

THESE flexible back, metal-cutting saws have teeth as hard and as tough as a hack saw blade. Made from electric furnace steel, and heat treated by the most experienced producers of metal-cutting band saw blades. Used widely in foundries and metal-working plants for cutting all types of ferrous and non-ferrous metals.

and MILFORD PROFILE SAW

The *narrow* band saw for all contour sawing, jig, and band saw machines. Made from the same steel as the famous MILFORD flexible back saws, but designed and heat treated for cutting irregular shapes, either internally or externally, in metal or plastics.

Order from your Mill Supply Distributor. He is always ready to serve your needs for all factory and mill supplies as well as MILFORD hack saw and band saw blades.

MILFORD
PROFILE AND BAND SAW BLADES
RESISTOR AND DUPLEX HACK SAW BLADES

THE HENRY G. THOMPSON & SON CO.
Saw Specialists Exclusively for Over 65 Years
NEW HAVEN 5, CONNECTICUT, U. S. A.

(Continued from page 302)

production of the magazines and Sunday Inquirer rotogravure sections, for paper storage and for executive and general offices of the magazines.

Storage facilities will provide room for more than a year's supply of paper.

The sub-basement, with a cement floor 24 ft below grade, will be utilized almost entirely for paper storage. Shipments are received over Reading Railway trackage at enclosed docks within the new building. Automatic conveyors move the paper rolls from the unloading docks either to the press rooms or to various areas where tiering machines rack them three or four tiers high.

The conveyor system provides automatic handling of rolls and a complete linkage between docks, sub-basement storage, first basement reel room and storage, storage in the garage across 15th Street, and the press room of the existing building reached through bridges, as already mentioned.

Also at the sub-basement level is a mezzanine at one end containing electrical and carpenter shops and building maintenance and service quarters.

Nine Rotogravure Presses To Be Installed

On the first basement, or reel room level, are the concrete foundations for the nine rotogravure presses presently to be installed, and with provision for nine more at a future date. Paper rolls are brought in at this level by automatic conveyor.

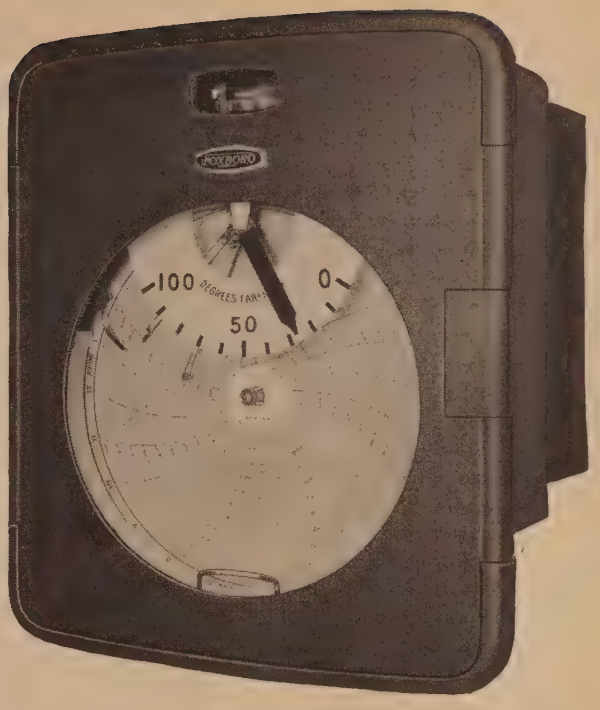
The first floor contains the press room proper, cylinder processing, and general offices. There are also lockers, copy rooms, proof presses, knife grinding and other service departments at this level.

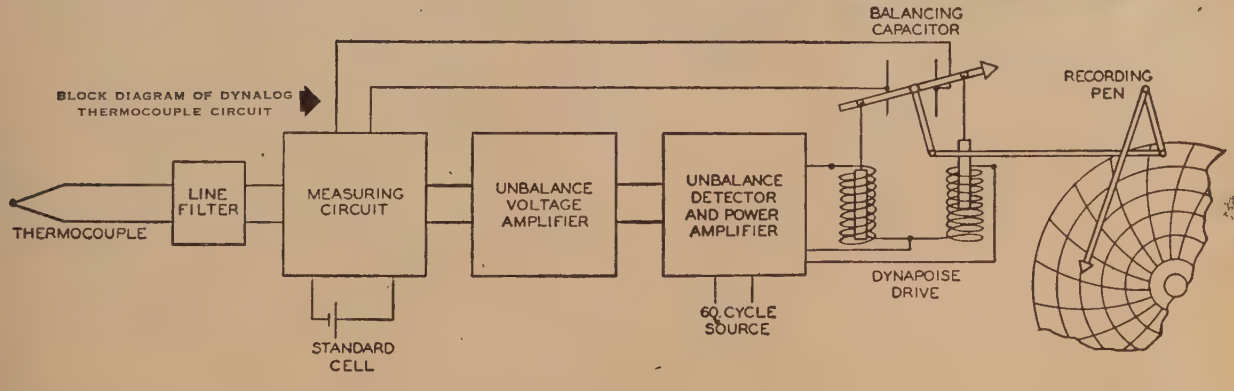
Cylinders move through the various processing stages, from washing to plating, etching, developing and laydown, by automatic monorail conveyor. From processing they continue automatically by monorail through three air locks, each with photo-electrically controlled doors on to the roto room. The air locks are completely air conditioned, and full ventilation is provided in both reel and press rooms.

A mezzanine and visitors' balcony overlook the press room the full width of both ends and on the full south side. Visitors may thus view the printing operation from

(Continued on page 306)

NEW DYNALOG CONTROLLER for THERMOCOUPLES





Gives STEPLESS balancing . . . Needs no standardizing!

FOR THE FIRST TIME in a thermocouple instrument, measurement of temperature is not only *continuous*, but STEPLESS. That's because Dynalog Thermocouple Instruments use a simple, variable, balancing capacitor instead of the traditional slide wire.

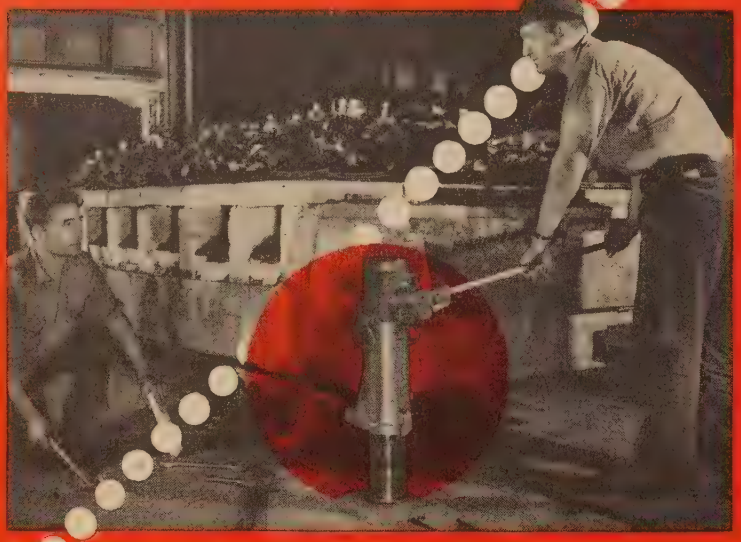
FOR THE FIRST TIME, the measured voltage is compared directly to a Standard Cell. This eliminates the need for a dry cell battery requiring periodic standardization and replacement.

FOR THE FIRST TIME, in thermocouple measurement, the new Dynalog Recorders and Controllers offer you the advantages obtainable only in an instrument designed from start to finish for electronic operation . . . advantages which provide an unequalled combination of speed, sensitivity, and freedom from maintenance.

Whenever you need dependable, hairline control of temperatures, count on the unique advantages of these thermocouple-type recorders and controllers. Dynalog Controllers are made in air-operated (Model 40) types, and on-off or 3-position electric (Rotax) actions. Write for full details in Bulletin 397. **The Foxboro Company, 138 Neponset Ave., Foxboro, Mass., U. S. A.** Branches in principal cities.

FOXBORO REG. U. S. PAT. OFF. **ELECTRONIC INSTRUMENTS**

DUFF-NORTON JACKS



LIFT HEAVY EQUIPMENT . . .

Jacks from 10 to 100 Ton Capacities Take Heavy Lifting Jobs With Ease.

. . . for heavy duty work

DUFF-NORTON HEAVY SCREW JACKS

Designed and constructed for heavy duty service, Screw Jacks are available in 10 to 100 ton capacities, with raises from 7 to 14⅜". Tell us type of lifting and number of jacks required, for recommendations and proposal.

Lifting the heaviest piece of equipment in your plant is a cinch for Duff-Norton heavy duty Screw Jacks. Workmen like them because they help get heavy lifting jobs done fast, with a minimum of effort, due to leverage used and ball bearing action.

A delay in getting one item of damaged equipment back to work may cost more than the price of the jack. Do your millwrights have the proper jacks for such work? For quick action on getting complete data, call your local industrial distributor, or write Duff-Norton direct.

Ask for Catalog 203!

THE DUFF-NORTON MANUFACTURING CO.

PITTSBURGH, PENNSYLVANIA

There Is a Distributor Near You

(Continued from page 304)

all angles, in contrast to the conventional, restricted balcony view.

Also on the mezzanine are a large cafeteria for employes, visitors and executives; the photo, monotone and color department, with wood etching booths, dark rooms, camera rooms, layout and retouching and employe lockers. The color department—most sensitive in the entire plant—is highly air conditioned and held to a variation of not more than two degrees.

The second floor contains the magazine mailing and binding departments, men's and women's toilets and rest rooms, first aid, special proof room and air conditioning equipment.

At the base of the tower is the solvent recovery room with adsorber tanks, and in the tower are fan rooms and cooling equipment. While the solvent recovery installation is elaborate and expensive, it is expected to return the investment within five years.

Fire-Prevention Plans

Extensive fire-prevention and control measures have been taken throughout, including the already mentioned concrete encased solvent piping, cardox system in press control and press rooms, frequent spacing of hose reels, and sparkproof aluminum plate floor in the press room.

The ultra-modern exterior and interior appearance of the project is matched by advanced utilitarian features looking to eventual needs of the publishing business. Above the processing department is a flat roof 125 ft by 200 ft which will serve as a helicopter landing area in the event paper delivery by this method is proved feasible. Newspapers will move from the press room in the existing building, across the bridge by conveyor, and go by chute to the sub-basement level, whence they will be elevated to the helicopter roof.

An open area north of the addition now under construction will be utilized immediately as a parking lot but will eventually house a multistoried addition for television.

In addition to a number of new rotogravure features, this new printing plant will have installed on its press equipment the first electronic drives ever used in the world on printing or publishing equipment. These are now being manufactured for The Philadelphia Inquirer by the General Electric Co.

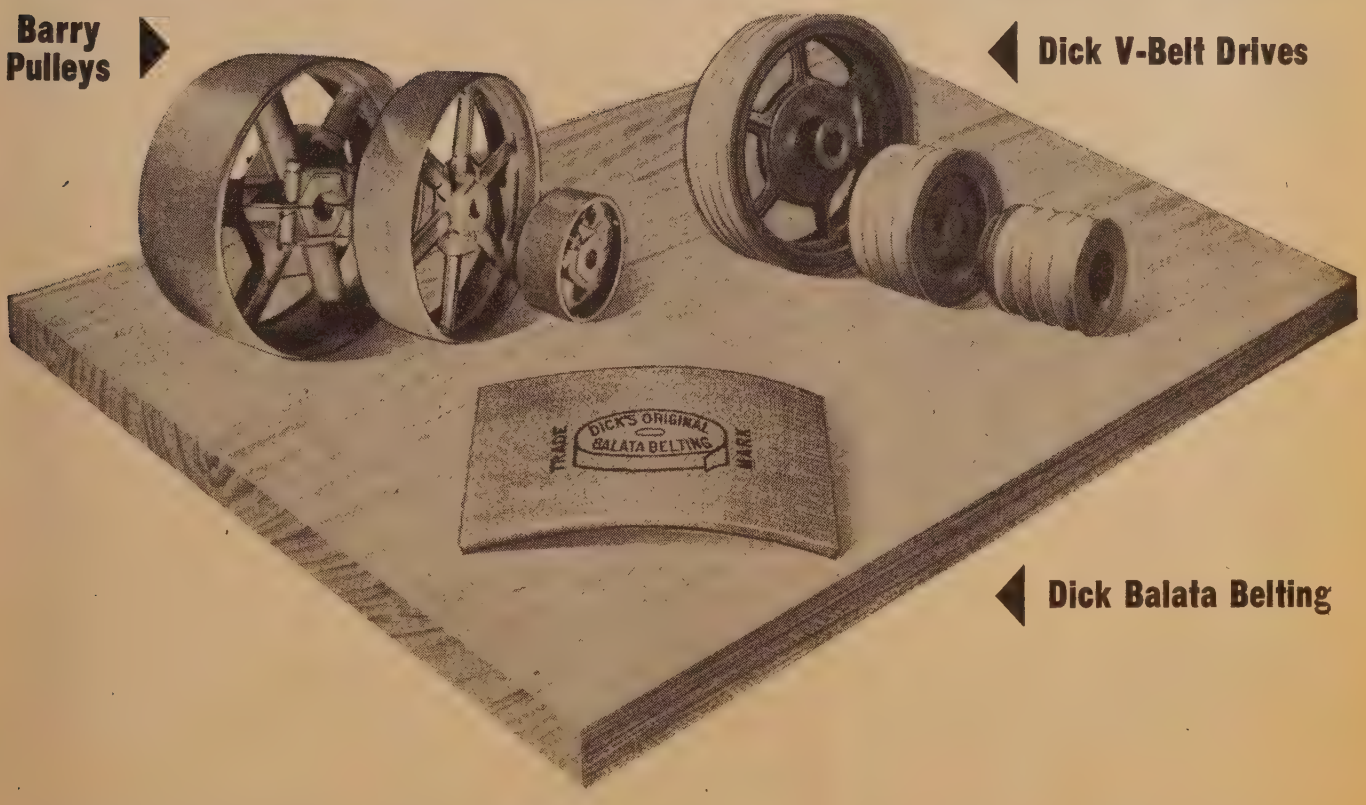
(Continued on page 308)

cut your COSTS!

...MANPOWER—
...HORSEPOWER—
...MAINTENANCE—

Use

DICK POWER TRANSMISSION EQUIPMENT



STANDARDIZATION on the Dick line of Barry Pulleys, Dick V Belt Drives and Dick Balata Belting assures real savings through lower power and maintenance costs.

Barry Steel Split Pulleys . . . the light weight, strong pulleys of welded construction which effect savings in installation and can be depended on for high efficiency and long-lived accuracy.

Dick Rope V-Belt Drives . . . providing high efficiency, longer belt life and all around satisfaction with a minimum of attention. Carefully balanced and accurately machined sheaves assure smooth, carefree operation.

Dick's Balata Belting . . . of strong, durable, uniform construction, and applicable to a wide range of power, elevating and conveyor requirements. This belting has long since proved itself in service to operate with minimum stretch and maximum efficiency. Furthermore, it can be used where water and steam are present, because it is immune to such conditions.

R. & J. DICK COMPANY Inc. PASSAIC, NEW JERSEY

San Francisco, Cal. Chicago, Ill. Seattle, Wash.

more of those

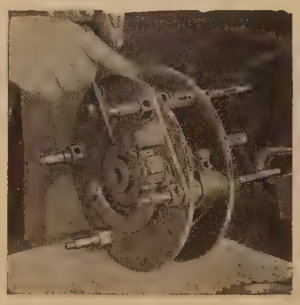
ALL STEEL CONSTRUCTION

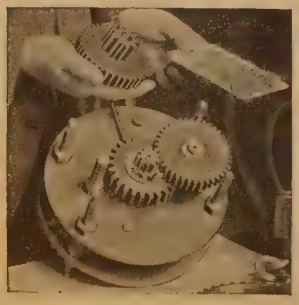
PEERLESS HOISTS

are available—with exclusive features

A solid steel SILENT ROTARY LOCK that sustains the load—without pawls or springs — instantly locks the load as soon as pull on hand chain ceases, assuring complete safety of the operator.

The *back* and *front frames* are of *thick rolled steel* chosen to carry the load on long ton rating. Tougher and stronger than cast parts, also lighter in weight. The load is carried on alloy steel bearings supported in steel cups welded to the frames.





Balanced gearing by equalized tooth pressure — chrome nickel alloy steel carefully heat treated, machine cut teeth—matched sets assure smooth operation and minimum friction . . . GUARANTEED FOR FIVE YEARS.

ORDER FROM YOUR DISTRIBUTOR

THE HARRINGTON COMPANY

PHILADELPHIA 30, PA.

(Continued from page 306)

● Distributor for Norton

The Long Island Hardware Co., 27-55 Jackson Ave., Long Island City 1, N. Y., has been appointed a distributor for Norton Co., Worcester, Mass., in order to provide service to industry in and around the New York metropolitan area.

● 20-Year Club Boosted

Membership of the Twenty Year Service Club of The B. F. Goodrich Co., rubber, chemical and plastics manufacturer, was boosted to more than 5,000 at the semi-annual pin presentation in Akron recently. Ten employes who had served 40 years, 81 with the company 30 years, and 297 in the organization 20 years were presented their service emblems by John L. Collyer, company president. All had completed these periods of service since last June.

● Producing Man Made Snow

Approximately a dozen foreign materials have been found capable of nucleating cold-chamber snow storms in a laboratory, it was announced in a paper presented at the annual meeting of the American Physical Society in New York City on January 30. The announcement was made by Dr. Irving Langmuir, associate director, Vincent J. Schaefer, and Dr. Bernard Vonnegut, all of the General Electric Research Laboratory at Schenectady. Best of the materials is silver iodide, they said.

Pointing out that a temperature of minus 31°F. is required for natural ice nuclei to form spontaneously, and that natural snowstorms often occur at temperatures higher than this, Dr. Langmuir said there is every reason to believe that nature often starts snowstorms with artificial nuclei. "And it is possible that one type of these artificial nuclei which Mother Nature uses may be some form of silver particles in supercooled clouds," he said.

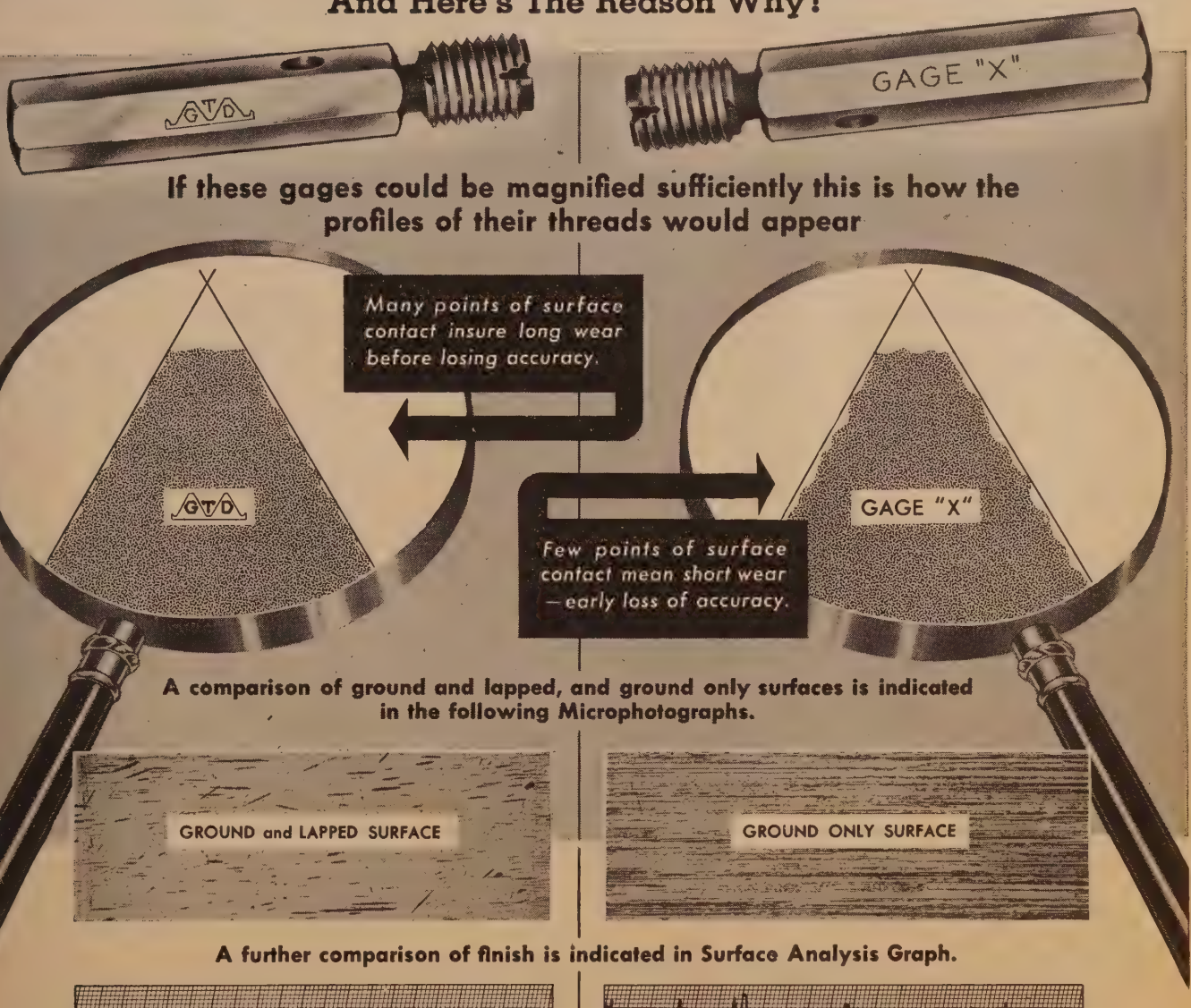
Among other foreign materials capable of acting as artificial nuclei for producing snow are lead iodide, iodoform, iodine crystals, apatite, nephelite, wurtzite, zincite, and cerium oxide, the scientists reported.

In the new means devised for producing man-made snow, supercooled water droplets in a cloud are literally "fooled" into crystallizing on foreign nuclei rather than on

(Continued on page 310)

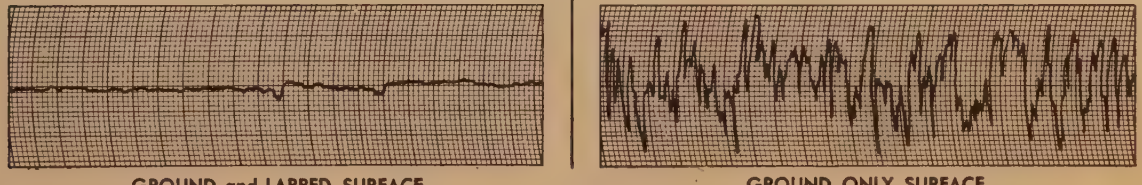
They Look Just The Same, BUT....

The "Greenfield" Gage Will Outwear Gage "X" Many Times. And Here's The Reason Why!


GTD
GAGE "X"
If these gages could be magnified sufficiently this is how the profiles of their threads would appear
Many points of surface contact insure long wear before losing accuracy.
GTD
GAGE "X"
Few points of surface contact mean short wear — early loss of accuracy.

A comparison of ground and lapped, and ground only surfaces is indicated in the following Microphotographs.

A further comparison of finish is indicated in Surface Analysis Graph.



GROUND and LAPPED SURFACE — GROUND ONLY SURFACE

Both gages will pass all measurement requirements. But the "Greenfield" Gage, because of its finely lapped surface, will outwear the other many times. *All* "Greenfield" Gages are lapped to an extremely high degree of finish. This "inbuilt" extra wear which gives long and accurate service and better value to users, is one reason for "Greenfield's" reputation in the gage field. *For better gaging, "GO" Greenfield.*

GTD Greenfield 75th YEAR

GREENFIELD TAP and DIE CORPORATION · Greenfield · Massachusetts
and its New Haven Division The GEOMETRIC TOOL COMPANY

FOR DRY OR COOLANT GRINDING

SPEED-WET* BOOSTS PRODUCTION with "RESIN-BONDING"

Resin-bond production is premium production — improved speed, stamina and finish at lower cost. Why? Because each individual abrasive grain in Speed-wet resin-bonded products is twice anchored in a heat-set resin adhesive, which, once hardened, can never remelt or flow or release its grip.

When used dry, Speed-wet resin-bonded abrasives are immune to cutting heats and humidity. Used wet, they are impervious to water, cutting oils or coolants.

Thus, for dry or coolant grinding, or for polishing and finishing of metals or glass or plastics, Speed-wet resin-bond abrasives deliver extra performance. Specify Speed-wet Metalite for aluminum oxide grit—or Speed-wet Durite for silicon carbide. Metalite or Durite, they're both resin-bonded if they are marked Speed-wet*.

*Reg. U. S. Patent Off.

BEHR-MANNING · TROY, N.Y.
(DIVISION OF NORTON COMPANY)

(Continued from page 308)

natural ice nuclei, the G-E scientists related. Since each of the foreign nuclei has a crystal structure similar to that of ice, the droplets are "deceived" by the similarity and change to snow by using the foreign nuclei to initiate growth.

Since most of the foreign or artificial nuclei become active at temperatures much higher than the temperature necessary for ice nuclei to form spontaneously, their discovery considerably enhances man's ability to "make it snow," according to the scientists.

Introducing Artificial Nuclei

Although at too early a stage for prediction of actual uses, the discovery might make possible the seeding of vast areas of atmosphere with foreign nuclei. Unlike ice nuclei, which melt or evaporate, many such artificial nuclei might be introduced by generators on the ground into the atmosphere and remain there until they produce snow, the scientists said.

Dr. Langmuir pointed out that atmospheric seeding with artificial nuclei might eliminate severe airplane icing conditions over large areas and might curtail to great extent severe hail storm activity prevalent in parts of the midwest.

"Undoubtedly, some climatic or weather changes would ensue from vast area seeding, but we are in too early a stage to speculate on that," Dr. Langmuir said.

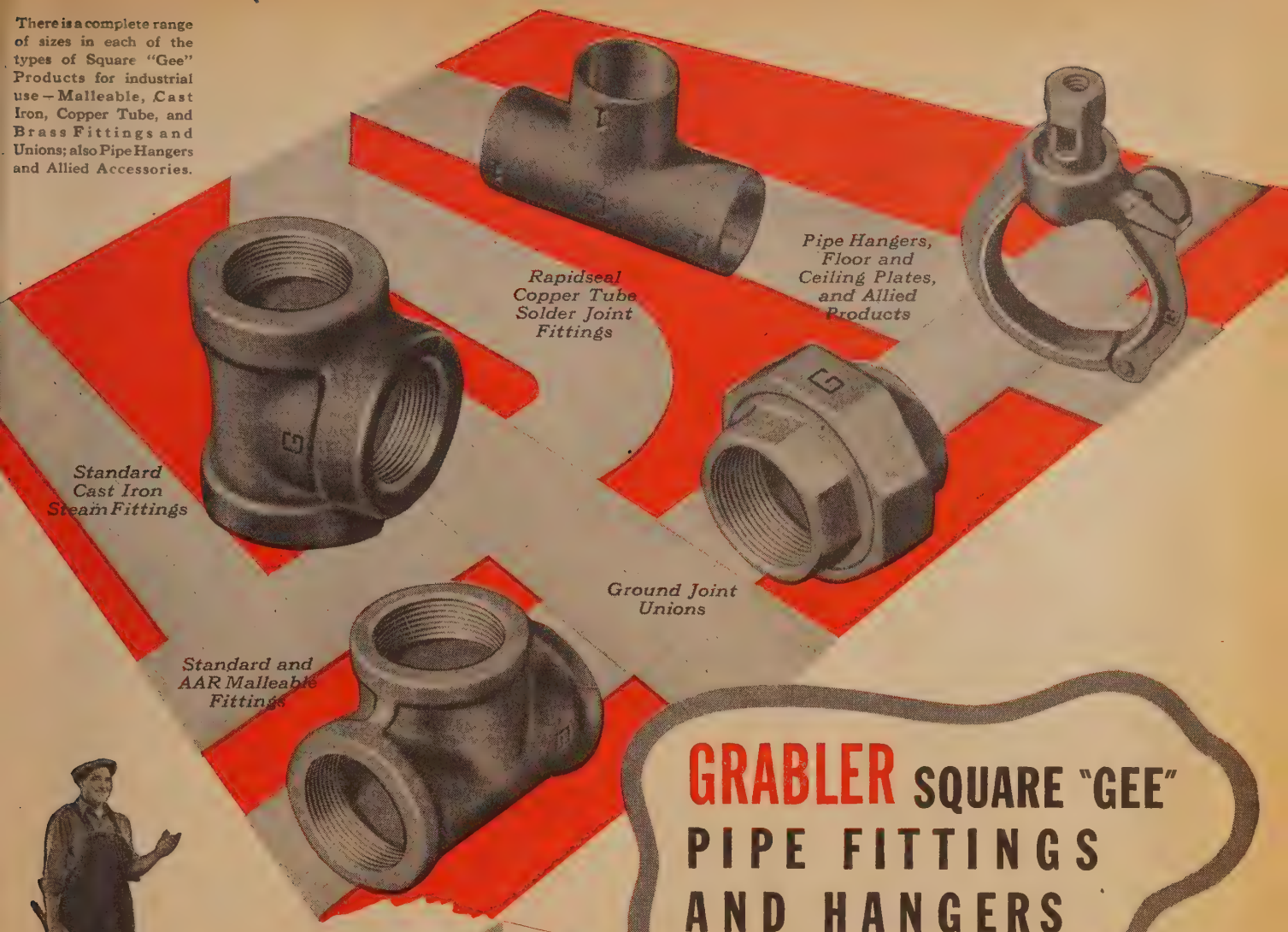
An indication of how small an amount of silver or other critical material would be necessary for artificial seeding was given by Schaefer, when he estimated the size of nuclei to be of the order of 100 Angstroms, or about one millionth of an inch in diameter. "On this basis, if everyone in the United States were given 10,000 such nuclei, the total would be the equivalent of about one grain of salt," he calculated.

Dr. Langmuir estimated that approximately 200 lbs. of silver iodide might prove sufficient to seed the entire atmosphere of the United States at a rate of 100,000 nuclei per cubic foot. "About one pound of silver iodide per hour of additional seeding probably would be required to maintain this condition," he added.

In experiments with silver iodide described by Dr. Vonnegut, a silver iodide-coated string was fed into a high-temperature flame, changing the silver iodide to a gas. Simultaneously a jet of air, blown over the flame, cooled and diluted the gas,

(Continued on page 312)

There is a complete range of sizes in each of the types of Square "Gee" Products for industrial use—Malleable, Cast Iron, Copper Tube, and Brass Fittings and Unions; also Pipe Hangers and Allied Accessories.


Rapidseal Copper Tube Solder Joint Fittings
Pipe Hangers, Floor and Ceiling Plates, and Allied Products
Standard Cast Iron Steam Fittings
Ground Joint Unions
Standard and AAR Malleable Fittings

GRABLER SQUARE "GEE" PIPE FITTINGS AND HANGERS

The man with the pipe wrench avoids time-wasting grief with Grabler Square "Gee" Fittings.

Your plant maintenance man—the man with the pipe wrench—needs good pipe, good tools and good fittings to forestall pipeline trouble on pipelines conveying air, gas, steam, oil, water and other liquids. Give him Grabler Square "Gee" Fittings for new pipeline installations, and for fixing a leak in an active line, quick. Grabler Square "Gee" Fittings make air-tight, leak-proof connections that stay tight. Precision-cut threads and smooth chamfering assure quick, fumble-free starting in hard-to-reach places. Husky beads provide a solid grip for the wrench. Truss construction and uniform body structure leave no vulnerable points of weakness to cause trouble. Help your man with the pipe wrench—your plant maintenance man—to avoid unpredictable emergencies. Provide Grabler Square "Gee" Fittings for every pipe connection throughout your plant and wherever pipe is assembled on equipment. Order them by name from your wholesaler. Ask for Grabler Square "Gee" Pipe Fittings.

THE GRABLER MANUFACTURING CO.

6565 BROADWAY • CLEVELAND, OHIO

THE SQUARE "GEE" LINE INCLUDES:

Malleable Fittings • AAR Fittings • Unions • Rail Fittings • Cast Iron Steam and Drainage Fittings • Patented Drainage Fittings Brass Fittings and Unions • Steel and Brass Nipples • Hangers Floor and Ceiling Plates • Copper Tube Solder-Joint Fittings

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Special markers for hot and cold steel, glass, cellophane, leather, rubber—markers that will do an *outstanding* job on any surface—are included in the Old Faithful line. They're precision made by marking engineers . . . the product of 112 years of manufacturing experience.

Send to Dept. MF-33 for the FREE Industrial Crayon Guide.

THE AMERICAN CRAYON COMPANY
1706 HAYES AVENUE, SANDUSKY, OHIO
NEW YORK SAN FRANCISCO

(Continued from page 310)

causing formation of an invisible "smoke" of extremely-small silver-iodide particles in crystalline form. This "smoke" was then collected in a rubber bulb and kept there until ready for use.

When the silver-iodide, in this form, was dispensed into a super-cooled cloud in a cold chamber, water droplets comprising the cloud crystallized on the silver-iodide nuclei, and snow resulted.

The transformation from water to snow took place at a temperature of plus 15°F. as contrasted to minus 31° necessary for spontaneous ice nuclei.

Lead iodide, in similar experimentation, accomplished transformation from water to snow at a temperature of zero Fahrenheit.

Schaefer's original snow-making technique, in which he caused spontaneous growth of natural ice nuclei by introducing dry-ice, initiates crystallization or change from water to snow at any temperature below 32°F.

Most novel experiment was conducted by Robert Smith-Johannsen, another laboratory member, when he discovered a use for the "cigarette lighter that doesn't work." Flicking a cigarette lighter, which contained no fluid, he noticed smoke given off from the spark and hit upon the idea that particles contained in the smoke might serve as nuclei.

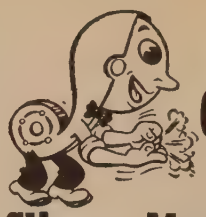
He sparked the lighter in a super-cooled cloud, and snow formed. Particles from the flint proved to be the nucleating agents, and the "flint" upon analysis proved to be commercial cerium. Thus, cerium oxide became listed as a possible type of nuclei for snow.

At present, methods are being developed by the G-E Research Laboratory to carry on outdoor experiments in natural conditions. The work will be undertaken in conjunction with the U. S. Army Signal Corps Engineering Laboratories, Bradley Beach, N. J., and the U. S. Army and Navy Air Forces.

• Dealer for Lincoln

The Wallner Welding Supply Co. has been appointed as dealer in Duluth, Minn., for The Lincoln Electric Co., Cleveland, Ohio. The new dealer is located at 303 South First Ave., East Duluth. L. D. Wallner is general manager of the company. During the past year he was employed as a welding engineer by the company in the Duluth area.

(Continued on page 314)



FASTER CUTTING ...with Clipper Masonry Saws

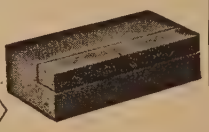
Your Special Size and Shape Brick or Concrete Block can now be "Tailor-Made" at a moment's notice!

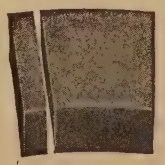
The new Clipper Multiple Cutting Principle makes possible faster cutting of every masonry material regardless of hardness.

Here are a few typical examples of the speed and accuracy with which concrete products and fire brick can be cut.

This concrete block, converted into a special size, was cut completely in two in 19 seconds.

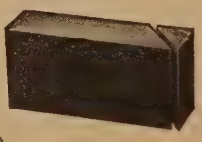
One of the many intricate cuts performed on first quality clay brick for heat treating furnaces—made in 8 sec.

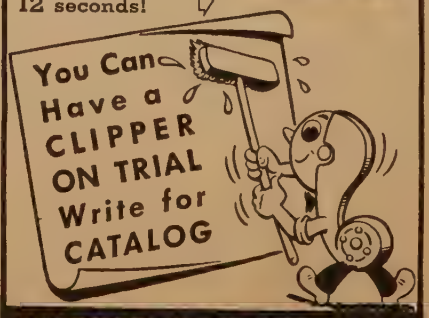




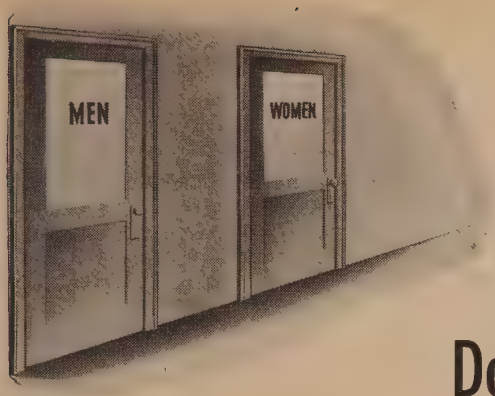
Rotary Kiln Blocks, cut to size for "key" bricks in rotary kilns, require only 10 sec. for completion of cut.

Basic refractories for steel furnaces or cement kilns must be accurately installed. This magnesite brick was cut in 12 seconds!

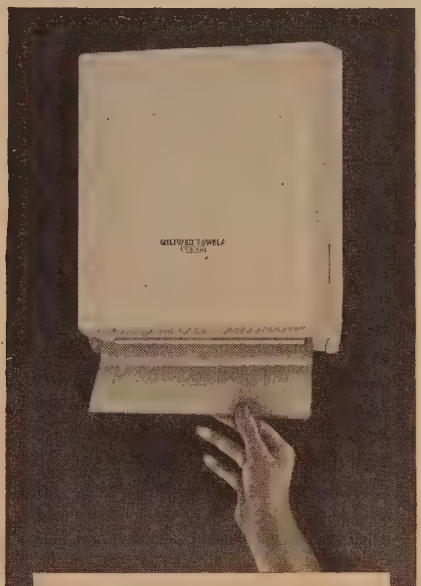




CLIPPER MFG. COMPANY
2800 Warwick, Kansas City 8, Mo.



Don't underestimate the importance of these facilities in building good employee relations



Onliwon Towels are strong when wet . . . dry without leaving lint . . . are pleasant to use . . . and only one *does a complete drying job for hands or face. The Onliwon "wet strength" process and method of folding produce economies that make Onliwon Towels cost less to use than most lower priced paper towels.*

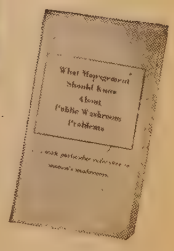
YOUR washrooms are seen by practically every employee every day—and they have a direct bearing on employee morale. Clean, sanitary washrooms build good will and respect for your company. Repulsive washrooms breed vandalism—and are a menace to the health of all who use them.

Onliwon Washroom Service is used by many leading business firms because it contributes to good employee and public relations through neatness, sanitation and health protection.

Onliwon Towels, Tissue and Seat Covers, when dispensed from Onliwon Cabinets, give the user the assurance of safe, efficient service. The paper is touched only by the hands of the user, an essential sanitary requirement in public washrooms.

A.P.W.

ONLIWON WASHROOM SERVICE builds better employee relations



FREE—*To executives whose responsibilities include building better employee relations.*

This illustrated booklet . . . written with particular reference to women's washrooms . . . contains frank facts every employer should know. Please use coupon or make request on business letterhead.

Industrial Division, Room 105
A. P. W. Product Company, Inc.
Albany, N. Y.

Please send me, without charge or obligation, a copy of "What Management Should Know About Public Washroom Problems."

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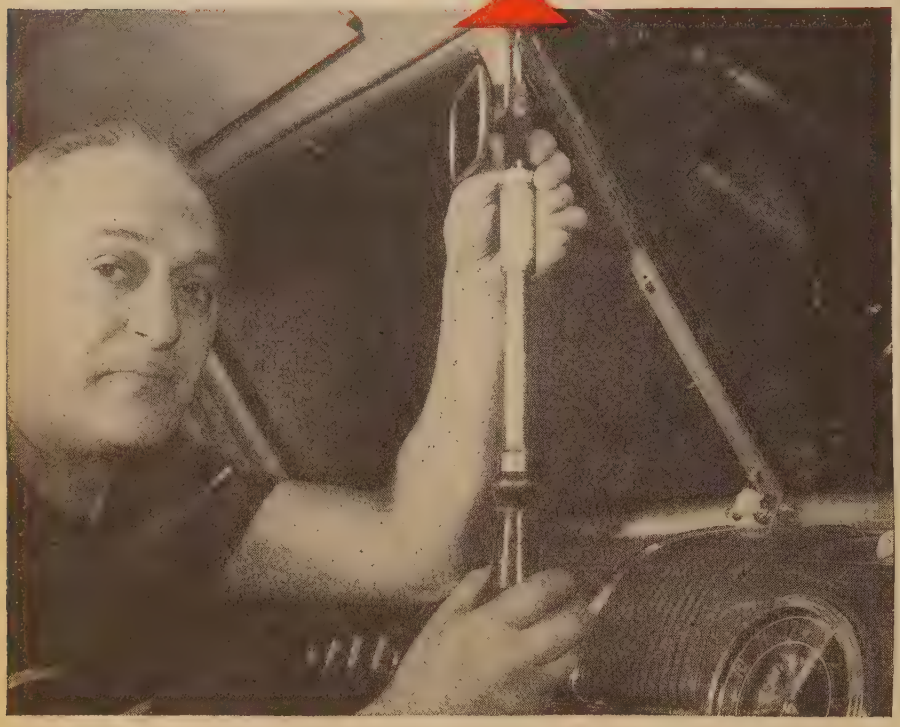
CORBIN-PHILLIPS CENTERED DRIVING SPEEDS PRODUCTION!



WOBBLE-WORRIED? NO SIR!
He's using CORBIN-PHILLIPS Screws

He's driving a CORBIN-PHILLIPS Sheet Metal Screw into the mirror bracket — where a slipped driver would scratch the finish and rip the fabric . . . But he's not "wobble-worried" because he knows the driver can't slip. It's *centered* in the CORBIN-PHILLIPS recess, held rigidly and securely in a steel grip that will set the screw up tight. He can work faster with less fatigue — and no work for the "fix-up man!"

CORBIN-PHILLIPS Screws offer you another big advantage — *uniformity!*

ALSO SCREW MACHINE PRODUCTS milled from bar on single- and multiple-spindle automatics . . . with secondary operations including centerless, cylindrical, surface, internal and thread grinding; roll thread; heat-treating; plating and polishing . . . and rigid inspection.

SP-71

CORBIN SCREW DIVISION
The American Hardware Corporation
NEW BRITAIN • CONNECTICUT

CORBIN PHILLIPS Screws

(Continued from page 312)

• Radio-Active Tracing

A patient on a standard x-ray table at the offices of North American Phillips Co., New York, is about to be checked with a Geiger-tube counter, an instrument capable of following the course of radio-active isotopes in their journey through the body. By introducing the proper isotope into the human system, studies can be confined in such cases to a particular organ or body section.

Radio-active isotopes, by-products of the atomic bomb, when employed in conjunction with the Geiger-counter tube, have given medical science a powerful new weapon with which to study and fight disease.

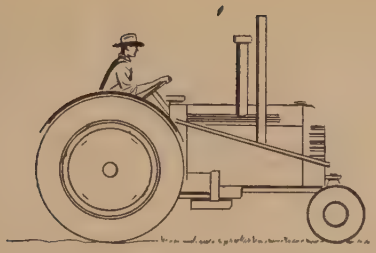
• Maintenance Solution for Carbide Users

National Tool Salvage Company, 6511 Epworth Boulevard, Detroit, Michigan, announces the opening of an expanded department for the salvaging of tungsten carbide tipped cutters.

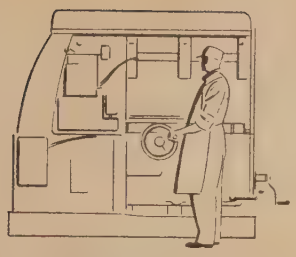
Hiram Ash, president of the company, in making the announcement explained that while the company has for some time handled this type of work, improved facilities have been made available and specialists in this type of work have been added to the staff. This places them in a position to accept work in any quantity that involves most types of salvaging from the resharpening of cutters or replacement of a broken tip to the complete alteration of cutters for other operations.

Interest in the use of carbide is at an all time high, Mr. Ash points out, with production men confronted with a new version of the old problem: initial tool costs, maintenance and replacement versus output. While the virtues of these tools are well established, breakage in sharpening or as the result of careless usage can easily

(Continued on page 316)



From Farm Machinery



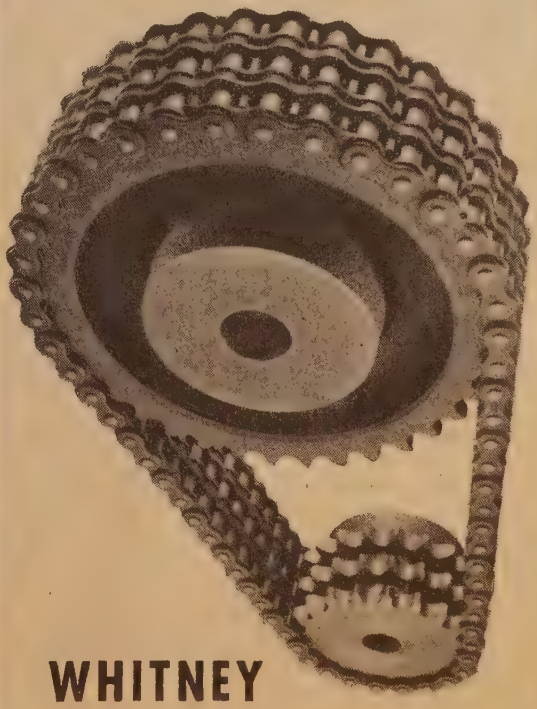
To Machine Tools...

Chain Drive IS BETTER

- *ADAPTABLE TO ALL DESIGN PROBLEMS*
- *POSITIVE GRIP ASSURES EFFICIENT POWER TRANSMISSION*
- *LONG OPERATING LIFE WITH MINIMUM MAINTENANCE*

Whether it's stationary or portable equipment . . . textile or agricultural machinery . . . chain power drive gives highest transmission efficiency. The positive grip eliminates power loss due to slippage and frictional contacts. Because chain drive transmits constant motor speed, it helps maintain product uniformity, cuts down rejections. Its flexibility and adaptability simplify design problems . . . provide a wide range of selection to every application. Chain drive is easy to install, easy to remove without disconnecting shafts . . . has high shock load capacity . . . does not require frequent adjustments to maintain tension . . . gives long-lived performance with little maintenance.

Investigate chain drive for your designs. Whitney Engineers will gladly help you with your problems. Write:



WHITNEY ROLLER CHAINS

These chains deliver constant, full power smoothly and efficiently. They stand up under the severest operating conditions. All parts are made of alloy steel, hardened to give maximum service with minimum wear. Whitney Roller Chains are available in many types in pitches from ⅜" to 2½". Write for complete specifications.

The Whitney Chain & Mfg. Company, Hartford 2, Connecticut

PRECISE 40

1/5 H. P.—40,000 R. P. M.

***Dozens of applications*—use it for faster, smoother work on steel, iron, bronze, brass, aluminum, plastics, wood, rubber, glass and most other materials.**

Speed with power with precision—that's the new PRECISE 40. Surpasses our own PRECISE 35 which outworked every tool in the field. In strong, light plastic case, PRECISE 40 weighs only 40 oz.—packs a record 1/5 H.P. New type quill mounts precision collet chuck or grinding wheel arbors of various sizes; push-button spindle lock for quick tool change. 90% greater cooling; four oversize ball bearings. Quickly lubricated by pressure gun through ball-valve inlets. Tool mounts in vise, lathe, stand, or milling machine or can be used with PRECISE accessories for special applications. Guaranteed shockproof without ground wire.

Write TODAY FOR HELPFUL NEW CIRCULAR

PRECISE PRODUCTS COMPANY

1322 CLARK STREET • RACINE, WISCONSIN

PRECISE 40

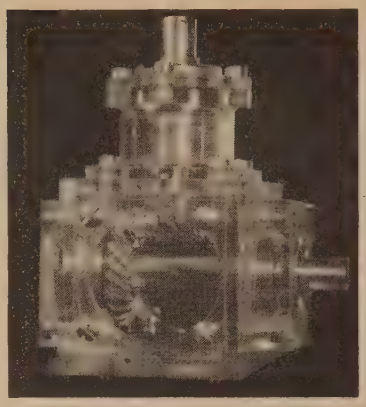
(Continued from page 314)

offset the advantages gained and must be considered in the adoption of carbide tipped tools for production use.

Due to the high original cost, scrapping and replacement of carbide tipped tools must of necessity be considered a last resort, it is said. More and more companies as a result of studying the possibilities of salvaging have found it possible to use carbide to replace high speed and have instituted regular salvaging programs. Procedures involve, (1) education of tool grinders to assure against damage to the tools and obtain the maximum number of grinds per tool, (2) competent inspection to determine the possibility of repairing damaged cutters for continued use, and (3) scheduling cutters worn undersize for altering to use on other operations.

Mr. Ash points out that deserving consideration is seldom given to the fact that a used tool that can be salvaged is a better gamble than a new tool. In substantiating this he points out that the structure of the metal, the cutting ability of the tool, the fit of the tool on the spindle or arbor and other characteristics such as concentricity and chip clearance have been proved and tested.

• Gear Model Enclosed



A unique demonstration model of a spiral bevel gear has been enclosed in solid, transparent Plexiglas by M. L. Bayard & Co., Inc., Philadelphia, Pa.

By enclosing all working parts of the gear in the acrylic plastic, the operation of the various parts may be observed to determine how the gear functions. In the actual assembly, all moving parts are made of steel. For any one predetermined gear ratio, the mounting flange and distance from the flange to the center of the assembly remains constant.

The gear is enclosed in its transparent housing by bolting thick machined pieces of Plexi-

(Continued on page 318)

"I've tripled production since I got this little 'Jim-dandy all-purpose power tool'."

BEARINGS

You can't go wrong when you get your bearings from the $23,000,000 stock now being sold by WAA. Friction and anti-friction bearings and components—all sizes and types—all unused and in top condition. Set your own price on what you need. Your nearest WAA Regional Office will give you all pertinent information on the sale and will assist you to make an inspection before submitting your bid.

Sales of Bearings will be held at frequent intervals. To receive information on future sales, write to the Regional Offices listed below asking that your name be placed on their mailing lists.

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1021

Here's why Workmen like

WELLS

METAL CUTTING BAND SAWS

The No. 8 showing new Wells Wet Cutting System—an economical accessory available for all No. 8 Wells Saws.

You don't have to go through a lot of motions when you use a Wells Saw. Just place the material in position for cutting, give a turn to the hand wheel of the quick-acting vise, and you're ready to go. Hydraulic stabilizer on gravity feed and automatic shut-off take care of the rest. *No wonder the Wells is popular with users!*

From a management standpoint, it pays to provide workmen with these modern, efficient, versatile tools. Use them in stock rooms, machine shops, on maintenance jobs. Wells Saws do good work, cut close, remove minimum material. For production work, your Wells Saw can be equipped with the new Wells Wet Cutting System. Ask for complete information. See your local Wells representative or write.

Specifications

CAPACITY: Rectangular 8" x 16"
(Special Guides) . . 5" x 24"
ROUNDS: . . . 8" Diameter
MOTOR: . . . ½ H. P., A. C. or D. C.
SPEEDS: Selective 60, 90, 130 ft. per min.
WEIGHT: . . Approximately 665 lbs.

Wells SAWS

Wells

Products by Wells are Practical

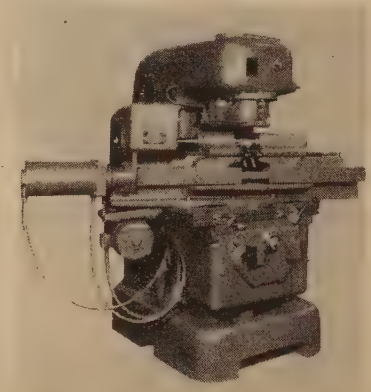
METAL CUTTING BAND SAWS

WELLS MANUFACTURING CORPORATION
909 TAFT STREET, THREE RIVERS, MICH.

(Continued from page 316)

glas together to form the box-like case. Space between sections prevents interference with the mechanism. The gear is operated by revolving either one of two exterior rods connected to the mechanism. Shatter-resistant Plexiglas weighing only half as much as glass, provides a sturdy housing for the gear at the same time offering salesmen a lightweight demonstrator.

● **Finishing Laminated Diameter**



It has been general practice to use one or two turning operations and where close tolerances are required, a final grinding operation, in finishing the laminated diameter of electric motor rotors. These operations have an inherent weakness in that they tend to smear and close the rotor laminations and where efficiency is a factor, it is necessary to add an additional operation in order to reopen them.

In order to remedy this difficulty and in addition to reduce machining time, Red Ring Engineers have developed a new machine for RotoShaving the laminations of motor rotors from the rough in one operation by combining three principles which have been thoroughly proved in other fields.

These are: (1) the use of a fine pitch high precision cylindrical milling cutter operating at high speed; (2) the principle of crossed axes shaving which has revolutionized gear shaving; (3) the principle of diagonally traversing the work across the cutter in order to spread the cutter wear uniformly over its full face and obtain optimum tool life. The net result is accuracy comparable with grinding, a considerable reduction in machining time and no

(Continued on page 320)

"There were giants in the earth . . ."

America, above all lands, is blessed with Nature's lavish gifts.

And since it was given to *man* to have "dominion over all the earth," it is fortunate for *mankind* that Americans are custodians of so great a store of the world's natural resources . . . modern-day giants in the earth. For Americans are not a race but a *melt* of peoples, combining the wisdom, strength, ingenuity and idealism of many. A people whose blended characteristics act to stimulate the development of natural resources for the uses of all humanity.

So it is that America has become the cornucopia of the world!

For generations the harnessing of Nature's giants was accomplished only by laborious effort. But as American inventiveness expressed itself in better ways to "subdue the earth" the utilization of natural resources was complete.

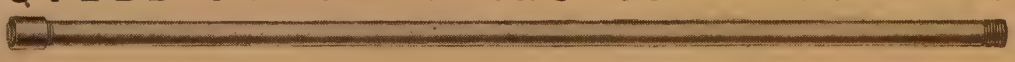
No single development has contributed more than the plentiful production of durable, reliable *steel pipe.* Pipe to make the great resource of pure water the available servant of the people, pipe to distribute natural gas, to carry compressed air to quarry hammers, to expel mine water, for use in extracting valuable minerals . . . pipe for a thousand-and-one jobs that multiply and accelerate the utilization of our natural resources.

Just as in other phases of modern American life, the development of natural resources has paralleled the development of steel pipe so that it becomes a truism to say *steel pipe makes it possible!*

The interesting story of "Pipe in American Life" will be sent upon request.

Committee on Steel Pipe Research
OF
AMERICAN IRON AND STEEL INSTITUTE
350 FIFTH AVENUE, NEW YORK 1, N. Y.

STEEL PIPE MAKES IT POSSIBLE!



. . . better living through pipes of steel for plumbing and heating purposes.

2 MEN load 9 TONS per hour*

*IN ONE YEAR THIS EQUALS 43,200,000 Pounds or 2 Heavy Cruisers

THE PROBLEM

Baker Cartage Company of Detroit hauls cartons of pistons for the Ford Motor Company. Cartons weigh approximately 50 pounds each and are stored in a large warehouse that does not have a loading dock. Cartons must be moved as much as 200 feet and then lifted into a truck.

SOLVED BY RAPIDS-STANDARD

Rapids-Standard engineers suggested Rapid-Wheel Gravity Conveyors with Q-Stands for carrying the cartons through the warehouse and a Rapid Power Booster for lifting them into the truck. The installation has been an outstanding success. Two men, one feeding the conveyor and one stacking inside the truck, handle an 800 carton load weighing 21 tons in 2⅓ hours. The complete operation can be handled by the driver and his helper.

The same set-up is used for unloading trucks. The direction of the Power Booster and the slope of the gravity conveyor are simply reversed.

The installation can also be operated with just one man. The conveyor is set up in the usual way and the man feeds the gravity conveyor until it is loaded with cartons for its full length. Then he climbs into the trucks, turns on the Rapid Power Booster and cartons are fed to him until the line is empty.

Rapids-Standard Portable Conveyors have a time and money saving place in the handling of cartons, bags, cases, bales, cans or packages. Write today for full information on how they will save for you.

OFFICES IN PRINCIPAL CITIES

Manufacturers of
STEEL FORGED CASTERS - TRUCKS - CONVEYORS - POWER BOOSTERS

The Rapids-Standard Co., Inc.

Sales Division — 375 Peoples National Bank Bldg., Grand Rapids 2, Michigan

(Continued from page 318)

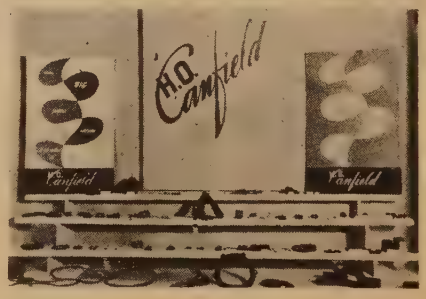
closing of the laminations or burring of the slots. In other words, better rotors with less capital investment, greater production and lower net cost per piece.

The new Red Ring Rotor Shaver is built somewhat along the lines of the gear shaving machine. The cutter head is adjustable to provide a wide angular range between work and cutter axes.

In addition to this, the table has a 15° swing in its horizontal plane to provide the diagonal angle desired. The knee is adjustable vertically for different diameters of work. Table travel, adjustment of head and tailstocks and knee are sufficient to accept rotors having a wide range of shaft lengths, face widths and diameters.

The illustration shows a rotor of 3¼" diameter and 2" face which is being completely finished with one pass in only 16 seconds. Approximately .030" of stock on the O.D. is removed to a finished tolerance of less than .002". Loading time is approximately 4 seconds. Air operated head and tailstocks and a work locator is provided to facilitate loading.

● New Canfield Display



According to E. R. Staley, general sales manager of the H. O. Canfield Co., the old adage—"Well displayed is half sold"—has again proved to be a cardinal point in effective product merchandising. In their New York executive offices, at 444 Madison Ave., the H. O. Canfield Co. now features a new display of their products.

This display attractively exhibits well over a hundred different mechanical rubber goods products. Some of these are regular standard products in the H. O. Canfield line. Others are special products made to exacting specifications of some particular customer. The over-all effect, Mr. Staley says, has been to arouse customer after customer to

(Continued on page 322)

ONE COAT OF KOPPERS

BITUPLASTIC

REG. U. S. PAT. OFF.

EQUALS 5 COATS OF PAINT

Bituplastic is *not paint* it is . . .

- • • A highly refined, easily workable coal tar pitch coating
- • • applied cold with brush or standard spray
- • • a complete vapor seal
- • • fire retardant
- • • impervious to temperatures of −50°F to +500°F
- • • applicable to damp surfaces
- • • virtually odorless and tasteless
- • • quick drying (usually a matter of minutes)

Announcing

BITUPLASTIC

REG. U. S. PAT. OFF.

A NEW PLASTIC PRODUCT

FOR CORROSION-PROOFING

ALL SURFACES EXPOSED TO WEATHER

A TIME TRIED, thoroughly reliable base —refined coal tar—as a stable dispersion in water—forms a thick plastic coating for the protection of metal, concrete or masonry surfaces.

Bituplastic covers heavily; 1/64" to a coat, or about 5 times the thickness of ordinary paint. Two or three coats provide a seamless, non-porous sheath up to 1/16" in thickness, completely resistant to most corrosive conditions.

Use it on bridges, culverts, decking, hoppers, piping, piers, floors, silos, tanks, trestles, tunnels, wells and to protect insulation from moisture penetration.

A new Bulletin on Bituplastic coating is ready. Ask your distributor or address as below.

GENUINE **BITUPLASTIC** CARRIES THIS SEAL

REG. U. S. PAT. OFF.

IS MADE ONLY BY

WAILES DOVE-HERMISTON

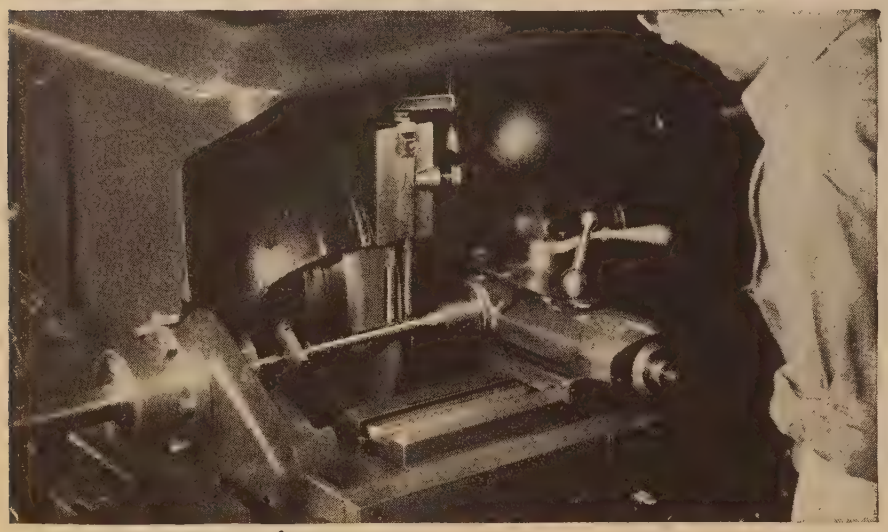
CORPORATION • A SUBSIDIARY OF

KOPPERS COMPANY INC.

WESTFIELD, NEW JERSEY

We'll see you at Booths 56-57 in the April 7-10 Exhibition of NACE at Chicago

3 point service



. . . for better precision grinding!

The use of straight oils for precision, production grinding is resulting in spectacular improvements in finish, and making it possible to grind within tolerances never before thought practicable. If you want better grinding, it will pay you to investigate the Stuart line of grinding oils.

To improve metal-working efficiency, take advantage of Stuart 3-point service:

1 ***The right oil for the job*** . . . every oil in the complete Stuart line is formulated for a specific purpose. Whatever the job, there is a Stuart oil to handle it best.

2 ***Sound engineering*** . . . Stuart engineers and laboratory technicians are neither text-book theorists nor self-taught handymen. They are practical oil men thoroughly schooled in their profession by study and first-hand experience.

3 ***Intelligent, specialized service*** . . . Stuart representatives have an intimate knowledge of metal-working oil requirements, and of the advantages of each Stuart oil. They will study your oil problems and help you solve them. For further information, write for "Grinding With Oil," a 12-page booklet.

ThredKut 99
. . . for grinding tough, stringy metals . . . makes grinding wheels *"act harder."*

SUPERKOOL 81X
. . . for precision grinding on metals in middle range of grinding hardness.

EXCELENE
. . . for grinding hard steels . . . makes grinding wheels *"act softer."*

D.A. Stuart Oil Co.
EST. 1865 LIMITED
2747 SOUTH TROY STREET, CHICAGO 23, ILL.

STUART *service goes with every barrel*

(Continued from page 320)

say—"I never knew that you people made all these different kinds of products." Inevitably this leads to a discussion of the products which had aroused their interest and frequently leads to a substantial sale.

The display is housed in a wall show case immediately adjoining the entrance. It is visible from any part of the reception room and the large array of different types of product often compels the visitor to step up to the show case and take a close look at the products. Two large placards invite their interest by proclaiming the fact that the H. O. Canfield Co. produces mechanical rubber goods with a wide variety of processes from pressure moulding to extrusion . . . from die-cut products to specification requirements. Another placard emphasizes the fact that no product is too large or none too small for the organization to handle with ease. Both placards are done in eye-catching shades of red, white and blue.

• Company Changes Location

The Cleveland Automatic Machine Co., after more than half a century of operation at the scene of its start in Cleveland, Ohio, has been moved to new headquarters in Cincinnati, where its permanent address will be 4932 Beech St. Business and sales offices were moved early in January and moving of plant equipment and personnel is expected to be completed early this month.

This marks the completion of a change started in 1944 when control of Camco was purchased by the LeBlonds of Cincinnati, a name made known in the machine tool field by the R. K. LeBlond Machine Tool Co. Harold R. LeBlond became president of Cleveland Automatic at that time. In September of 1946 The LeBlond Engineering Co., which he also heads, was merged into the Cleveland Automatic Machine Co.

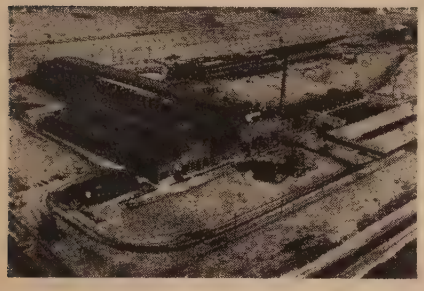
The company name will continue to be The Cleveland Automatic Machine Co., Mr. LeBlond states, and will be operated independently of the other LeBlond companies, continuing the production of Cleveland Automatics without interruption.

Sales manager John J. Prohaska and Glenn Miller, his assistant, are among the several executives who will have headquarters in Cincinnati. Sales headquarters will be at the Beech Street address. Key men

of the Camco engineering staff under the direction of chief engineer A. F. Jelinek, go to Cincinnati with the firm, as do J. C. Mazer, factory manager and many of his staff.

The Cleveland district sales office will continue under the management of V. J. Hannon, with new offices at 1114 N. B. C. building. All the property formerly occupied by the Cleveland Automatic Machine Co. was purchased in 1945 by The Thompson Products Co.

● New Company Formed



Canada Strip Mills Plant is Bought.

Noranda Mines, Limited, Toronto, Canada, has purchased from War Assets Corp., the plant known as the Canada Strip Mills plant at Montreal East, James Y. Murdock, K. C., president of Noranda has announced.

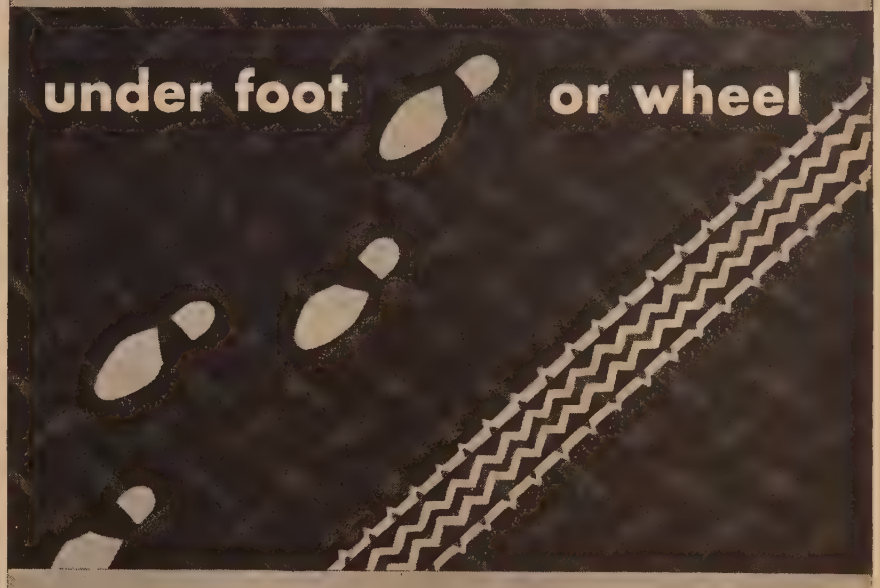
A new company, Noranda Copper and Brass Limited, is being formed to take over and operate the plant. Bridgeport Brass Co., Bridgeport, Conn., is associated with Noranda Mines in the operation of the new company. While Noranda Mines will have financial control, Bridgeport Brass has a substantial minority interest, Mr. Murdoch said.

Possession of the plant was secured January 1 and operations on a limited scale have already begun. "It will take some time, however, to adapt the plant, which was built for production of brass strip for munitions purposes, to the production of commercial copper and brass products," Mr. Murdoch said. "Purchase and installation of modern equipment is being conducted as rapidly as possible."

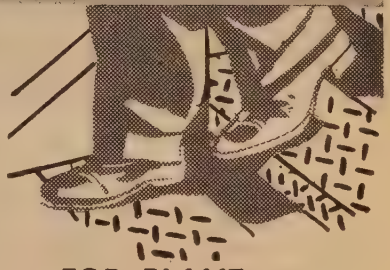
The plant is adjacent to two other Noranda subsidiaries, Canadian Copper Refiners Limited and the rod mill of Canada Wire and Cable Co. Ltd. "Its location close to a supply of copper and at the head of tidewater navigation has distinct advantages," Mr. Murdoch declared. "It is planned to produce a complete line of copper and brass mill products.

(Continued on page 324)

A Tread That Stops Slip!



Inland 4-Way Floor Plate



Yes, there is a tough, rugged flooring that will reduce slipping and falling hazards in your plant and on your equipment. Inland 4-Way is the safety flooring with raised projections designed and spaced to give a positive grip to foot or wheel in all directions.

The 4-Way pattern drains freely, sweeps and mops easily, requires a minimum amount of maintenance and lasts for years and years.

Because it is steel, the strongest flooring you can use, Inland Floor Plate will not warp, splinter, crack, burn, or absorb liquids and odors. It's easy to use for floors, steps, platforms, ramps and catwalks within your plant or on mobile and stationary equipment you manufacture or use.

Available from leading steel distributors. Write for catalog.

FOR PLANT INSTALLATIONS

FOR YOUR PRODUCTS, TOO

OTHER PRODUCTS: BARS • STRUCTURALS • PLATES • SHEETS • STRIP
TIN PLATE • PILING • REINFORCING BARS • RAILS • TRACK ACCESSORIES

INLAND STEEL CO.

38 S. Dearborn Street, Chicago 3, Illinois

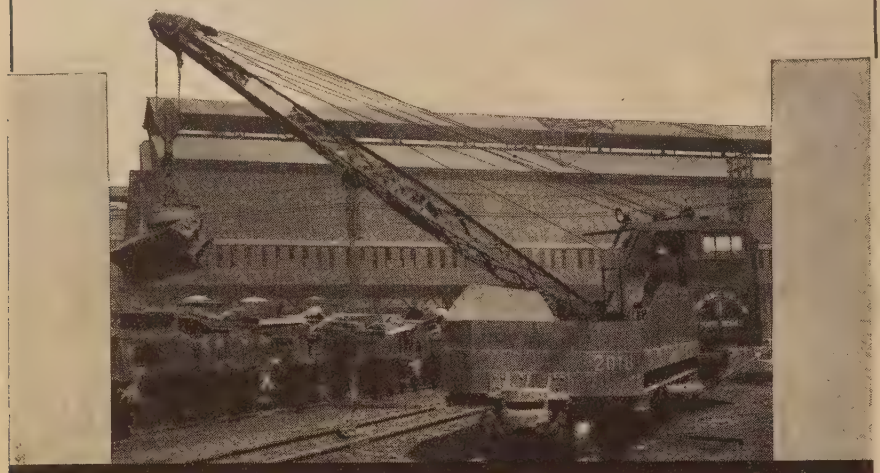
Sales Offices: Detroit, Indianapolis, Kansas City, Milwaukee, New York, St. Louis, St. Paul

Faster Production with a Burro

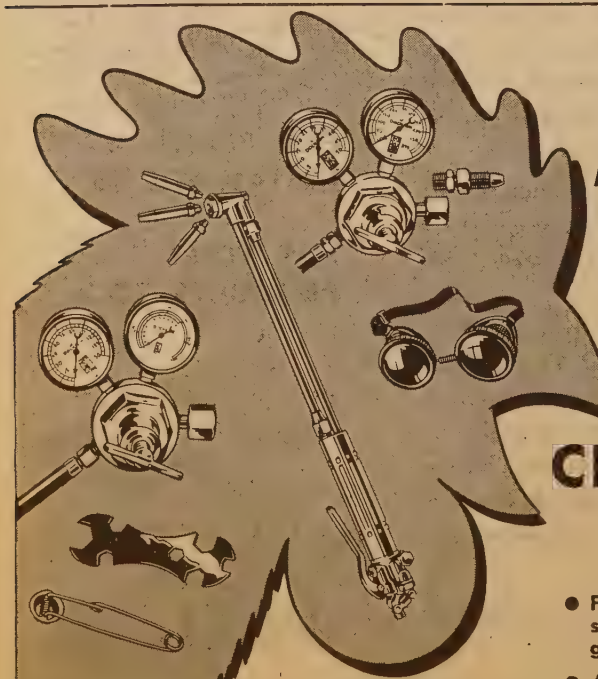
When you have a BURRO in the yard, you get jobs done faster, easier and more economically. This speedy, powerful locomotive crane does every job a crane can do with bucket, hook, magnet, tongs or drag-line and at the same time, serves as your private switch engine to spot cars *where* and *when* you want them. There is no waiting time with a BURRO.

BURROS are economical to operate, simple to maintain and are built for hard work. Watch a BURRO on the railroad or on a plant siding and see why it's the busiest crane on the track.

Write for Illustrated Bulletins



CULLEN-FRIESTEDT CO.
1311 S. Kilbourn Ave., Chicago 23, U.S.A.



A LOW COST ALL PURPOSE CUTTING OUTFIT WORTH CROWING ABOUT!

DOCKSON NO. 165 OUTFIT

- Torch balanced for effortless operation.
- A complete top quality outfit at a price you cannot duplicate.
- Forged and bar brass construction. Silver soldered gas connecting tubes.
- Accurate, sturdy regulators of simplified construction. Seats readily accessible without special tools.
- Adaptable to wide range of work by changing tips.

Write for welding and safety equipment catalogs.

Dockson CORPORATION
3839 WABASH AVE. • DETROIT 8, MICHIGAN

(Continued from page 323)

Management of the company will be directed by Herman W. Steinkraus, president of Bridgeport Brass Co., who will also be president of the new organization. Operation of the plant will be directly under the supervision of M. W. Batchelor, vice president in charge of operations for the Bridgeport Brass Co. Sales will be supervised by A. R. Zender, vice president in charge of sales for Bridgeport. Mr. Murdoch will be chairman of the board of the Noranda Copper and Brass Limited.

"Establishment of this new industry introduces a second source of copper and brass mill products to Canadian consumers," he said. "In addition to supplying employment to Canadian workmen, it will enable the export of a substantial tonnage of Canadian copper and zinc in the form of semi-finished products rather than as raw material."

• Shakeproof Is Licensed

Tinnerman Products, Inc., Cleveland, Ohio, has licensed Shakeproof Inc., Division of Illinois Tool Works, Chicago, to manufacture and market Speed nuts and Speed clips on which Tinnerman holds the patents. Classifications covered include U type, J type, and Latching type fasteners.

This move, according to Geo. A. Tinnerman, vice president and general manager, was due to a steadily increasing usage of the products and the desire to provide a constant adequate supply.

Shakeproof will go into production during the current quarter.

• Canadian Manufacturing

The first heat-resistant glass ovenware to be manufactured in the Dominion of Canada is now being produced in volume at the Leaside, Ontario plant of Corning Glass Works of Canada Ltd., William C. Decker, president, has announced. The Canadian company is a wholly-owned subsidiary of Corning Glass Works, Corning, N. Y.

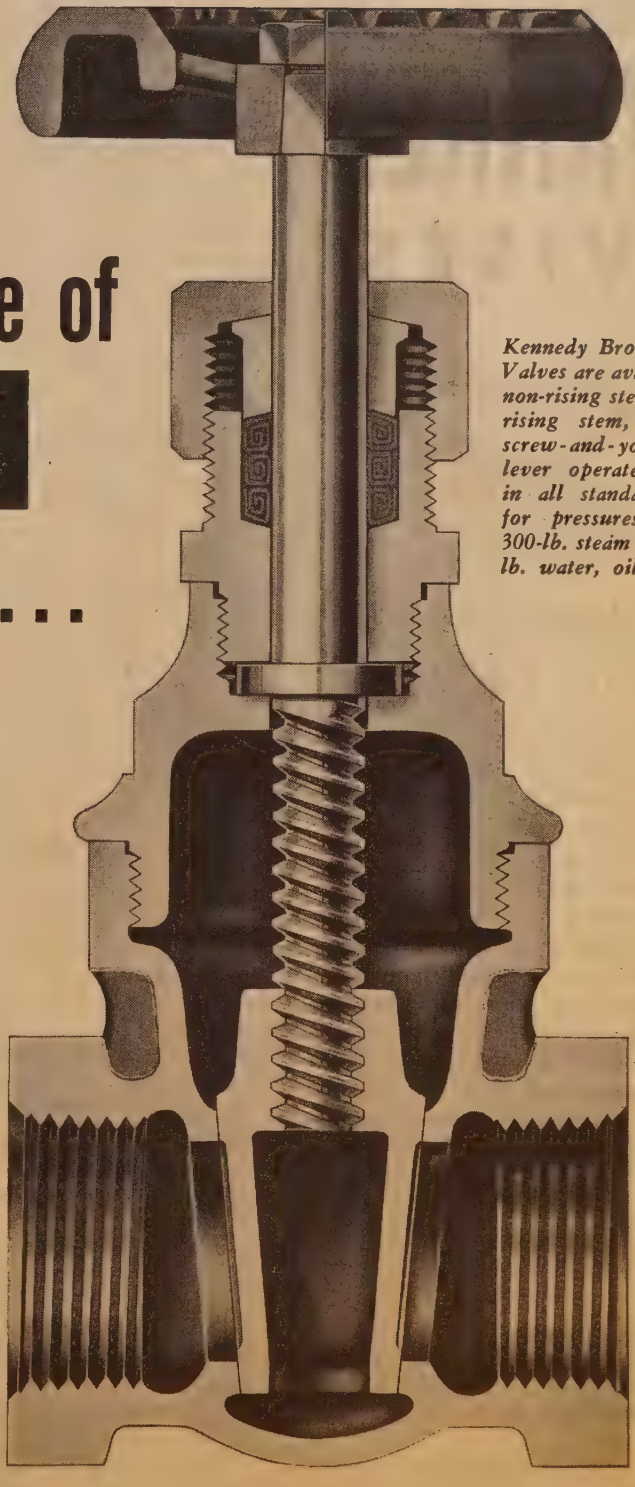
"With full-scale production," said Mr. Decker, "we expect to be able not only to supply a large part of the ovenware requirements in Canada but also to make some of our output available for export. Glass for these markets had previously been supplied by the Corning plants of Corning Glass Works."

The Leaside plant is part of the factory operated by Research En-

(Continued on page 326)

This... on the outside

is your assurance of lasting service on the inside .....



Kennedy Bronze Gate Valves are available in non-rising stem, inside rising stem, outside-screw-and-yoke, and lever operated types, in all standard sizes for pressures up to 300-lb. steam and 600-lb. water, oil or gas.

It's no secret—Kennedy Valves give long, trouble-free service because every part is designed for maximum life. Take this bronze gate valve, for instance. Note the large bonnet hexes close to the body. That prevents body distortion. See the large number of heavily proportioned stem threads . . . the simple, strong, accurately guided disc.

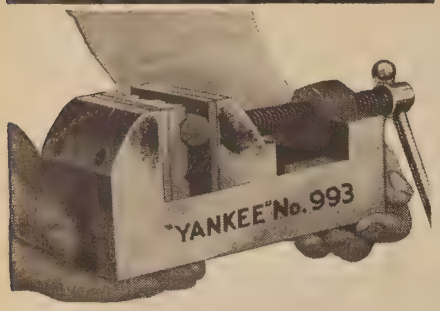
Look at *any* valve that has Kennedy on the outside. You'll find an abundance of long life features . . . all of them fully described in Kennedy's 240-page Catalog, along with complete information on Kennedy bronze and iron-body gate, globe, angle and check valves, pipe fittings and flanges, and other valves and accessories. Write for your copy today.

BUY FROM YOUR LOCAL DISTRIBUTOR

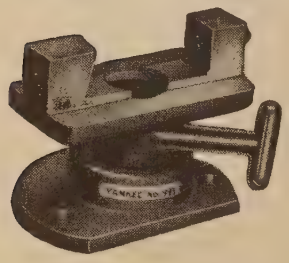
KV-146

KENNEDY valves-pipe fittings-fire hydrants

THE KENNEDY VALVE MFG. CO., ELMIRA, NEW YORK *Offices and Warehouses in Principal Cities*



"YANKEE"
VISES



hold the work all the way through

● With a "Yankee" Vise you align the work just once, no matter how many steps the job takes. Lifts on and off a swivel base. Use it on the swivel base for bench work. When removed, it is ready for use on milling machine or drill press. Accurately machined top, bottom, sides and front end. Makes handy, economical jig. V-grooved block for round stock. Four convenient sizes of "Yankee" Vises, with or without swivel base . . . 1½", 2", 2¾" and 4" jaw widths. Your industrial distributor has them. Full details about these and other handy shop tools in the "Yankee" Tool Book. Write for it today.

V-grooved block

YANKEE TOOLS NOW A PART OF
STANLEY
THE TOOL BOX OF THE WORLD

NORTH BROS. MFG. CO.
Division of The Stanley Works
Philadelphia 33, Pa.

(Continued from page 324)

terprises, Ltd., during the war years and was purchased from the Dominion Government in 1945. Reconversion work was completed last June and melting operations began immediately. Production continued on an experimental basis for several months and only recently reached commercial levels.

All manufacturing and warehousing operations are carried on in a single building, approximately 100,000 square feet in space. The plant is equipped with one tank, capable of melting 25 tons of glass daily, and two automatic presses on which a variety of Pyrex ovenware products will be made. In addition to the ovenware manufacturing program, Flameware products, made in Corning and shipped to Leaside, will be assembled with Canadian-made hardware.

● Jenkins League Gathers

The Veteran League of Jenkins Bros., Bridgeport, Conn., held its twenty-first annual banquet recently at the Stratfield hotel in Bridgeport. One hundred and thirty-two company veterans, whose services range from 25 to 47 years, attended, as well as 135 returned World War II veterans. James L. Dunn, vice president in charge of industrial relations of Jenkins Bros., presided at the banquet.

● RCA Merit Awards

Fifteen employes of the RCA Victor Division were honored recently with the highest award provided by the company for outstanding salaried workers when they were presented with the 1946 RCA Victor Award of Merit. The newly-established merit awards, according to the company's plan, will be presented each year to a maximum of 15 salaried employes in office, field and laboratory for individual exceptional performances during the previous 12 months' period.

The presentations, including one posthumous award, was made at a dinner at Hotel Barclay, Philadelphia, in the presence of top company officials. The posthumous award was made to the late Gordon E. Riley, former general traffic manager, who died in Chicago on January 5.

Principal speaker at the award dinner was Frank M. Folsom, RCA executive vice president in charge of the RCA Victor Division, who lauded the winners for their out-

FOR YOUR HEAVY MOVING

GUMWOOD ROLLERS

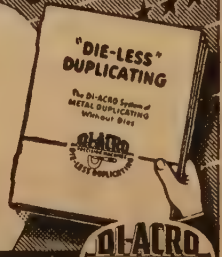
★ WILL NOT BREAK
★ WILL NOT SPLIT
★ WILL NOT SLIP

Sizes available:
4" x 6' • 5" x 6'
6" x 6' • 8" x 6'.

Special sizes made to order.

H. V. DE GALAN CO.
Detroit 7, Mich.

"DIE-LESS" DUPLICATING
SAVES MAN POWER AND DELAYS!
DIE ACCURACY WITHOUT DIES
Send for CATALOG



O'NEIL-IRWIN MFG. CO.
DI-ACRO PRECISION MACHINES DIE-LESS DUPLICATING
356 EIGHTH AVE., LAKE CITY, MINN.

standing contributions to the company's advances in 1946. J. G. Wilson, operating vice president, read the citations and made the awards, and J. K. West, director of public relations for RCA Victor, reviewed the entire Award of Merit program.

The award consists of a solid gold money clip embodying a miniature gold watch decorated with an inlaid RCA Victor trademark, and a scroll citing the recipient's outstanding performances.

Winners of the 1946 awards are: Albert F. Watters, John H. Pflieger, William T. Warrender, Robeson Howell, A. K. Weber, Neal A. Drought, J. K. Burton, Otto H. Schade, J. M. Clifford, W. F. Fell, Edward M. Tuft, Gordon E. Riley, H. M. Rundle, H. I. Reiskind and Merrill G. Gander.

The plan for salaried employes was designed as a counterpart to the suggestion system which has been in existence many years at the company and which has been largely applicable to hourly workers. Selections are made from among 50 nominations supplied by the various product and operating departments.

• New Electroplating Process

A new electroplating process in which finishing costs are reduced 20% or more while the resulting product has better quality and a finish fully equal to that produced by older methods was described by George W. Jernstedt, manager of electroplating projects for the Westinghouse Electric Corp., at a meeting of the American Electroplaters Society in Pittsburgh.

Very similar in technique to that of a master painter who, after making a stroke with his loaded paintbrush, then draws the brush back again to remove excess paint and a finish free of brush marks; in the new plating process, current is reversed periodically to remove surplus or unsound metal, level peaks, and polish. Loose or surplus plate is "wiped" off by these electrical back strokes leaving only the smooth, tightly fastened atoms. Successive layers of plate can be built up by this method to almost any desired thickness to make a deposit more dense and of greater homogeneity than that possible with conventional continuous-current methods.

Using the periodic reverse-current method, it is possible to produce a plate that is considerably smoother than the surface of the material to which it is applied. For example, a film of copper only .0015" thick has

(Continued on page 328)

Ready to Take a Beating to Save You Money

Bond REG. U.S. PAT. OFF. 140-A

TRUCK CASTER

Bond 40-A Series. A lightweight, extremely sturdy caster for heavy duty. Heavy metal construction lessens danger of breakage. Swivels with frictionless ease on hardened ball races. Pressure lubricated throughout. Plain and roller bearing semi-steel and rubber tread wheels. Wheel sizes: 4" to 10" dia.; load capacities: 140 to 950 lbs. per caster.

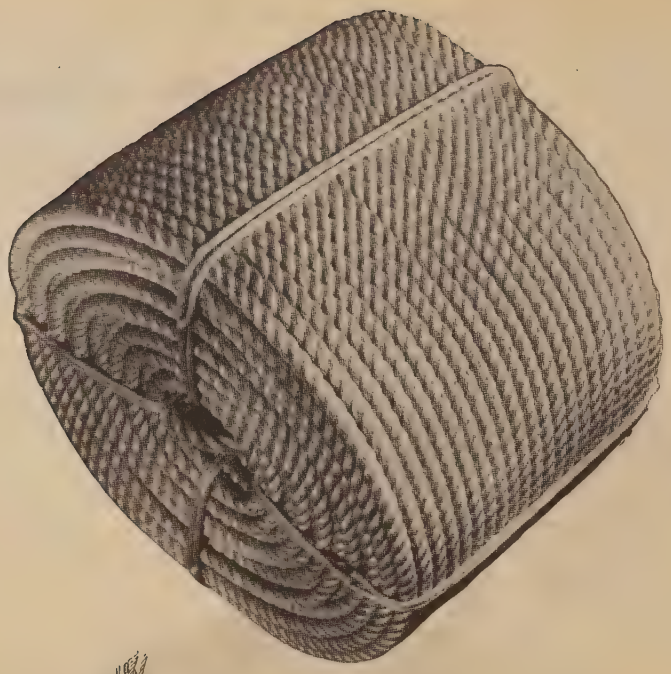
Bond 40-AH Series. A husky, structural steel caster. Heavy steel sections formed to shape . . . even thicknesses of metal throughout. Roller bearing semi-steel and rubber tread wheels. Wheel sizes: 8", 10", and 12" dia.; load capacities: 680 to 4500 lbs. per caster.

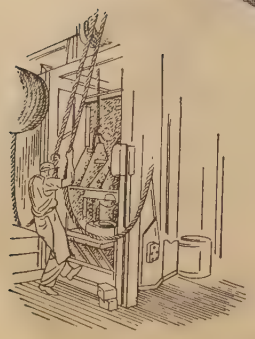
BUMPS and jolts and strains of heavy loads—the Bond 140-A takes them all without quitting. A sturdy, all-steel caster, it is practically indestructible. It's built to cut your replacement costs, curtail production delays. Easy swivelling, the Bond 140-A will do many good turns for you during its long service life.

Every caster in the Bond line is designed for particular working conditions. Let Bond engineers recommend the caster that's right in every detail for yours. Write for the free Bond catalog K-36 today.

BOND FOUNDRY & MACHINE CO.

MANHEIM, PA.





more than a Product . . . *a Service!*

The speeding breakers and drawing frames—the whirling spinners—the rumbling stranders and layers—that produce "AMERICAN BRAND" PURE MANILA ROPE, are but a part of the world-wide organization carefully geared to produce the very best in a complete line of cordage. Right from the stock of raw fibre—through research laboratory and mill—through distribution, out on the job where rope and twine and oakum and packing are used, American Manufacturing Company maintains a corps of technical and service representatives. As a result you will find "AMERICAN BRAND" PURE MANILA ROPE and other CORDAGE PRODUCTS unsurpassed in value.

"American Brand" CORDAGE

ROPE • TWINE • OAKUM • PACKING

A Complete Line from One Source of Supply

NATIONWIDE DISTRIBUTION
A network of distributors and dealers served by strategically located mills makes "AMERICAN BRAND" CORDAGE PRODUCTS readily available in all localities.

AMERICAN MANUFACTURING COMPANY, BROOKLYN 22, N.Y.

Branch Factories:

ST. LOUIS CORDAGE MILLS • ST. LOUIS 4, MO.
DELAWARE RIVER JUTE MILLS • PHILA. 48, PA.

Sales Offices: BOSTON • CHICAGO • HOUSTON • NEW ORLEANS • PHILADELPHIA

(Continued from page 327)

been plated on shotblasted steel with no evidence of the rough base metal being apparent at the surface of the copper plate. Burned electrodeposits, nodules, exaggerated buildup of metal at corners or at sharp points —all common in other plating methods—can be reduced or eliminated when the new process is used.

Greater speed is obtained in the periodic reverse-current method of plating mainly because stronger current can be used in the plating portion of the cycle. Since the metal surface is brightened by the current reversal, hand buffing or polishing can be cut down or eliminated entirely in many cases.

The new process works better with some electrolytes than with others. Plating baths best suited for its use are the cyanide-type baths such as copper, silver, zinc, cadmium and even gold. In general, definite and substantial improvement is evident with the new method in most acid and alkaline electrolytes. The speaker emphasized that such factors as temperature, metal concentration and alkalinity or acidity of the solution must be carefully studied to obtain the best results for each adaptation.

• Schick Has Renovation

Final assembly line in Schick factory.

The Schick Shaver plant in Stamford, Conn., where almost 1000 skilled workers turn out the Schick products, has been given a complete refurbishing, inside and out, with realignment of production lines, addition of new machinery, and other improvements which will add materially to the company's production rate.

The outside of the factory has been painted; inside walls have been painted green and white, and all floors have been covered with a plastic finish which makes them easier to keep clean. Every machine has been refinished.

The result, according to Kenneth C. Gifford, president of Shick, is

"that we have a spick and span plant which makes working conditions easier, and which is giving us more production than ever before."

There have been changes in some of the production lines and addition of new machinery aimed to increase production. In order to keep the plant clean, a special period at the end of each week is devoted to a complete cleaning up of all machinery and the plant in general, in addition to the usual housekeping methods in operation at all times.

Employes of the plant, who belong to the International Association of Machinists, have entered wholeheartedly into the plan. The union has had a closed shop contract for years with the electric razor company. Greater production means an increase in earnings for employes because of the incentive payment plan which covers every worker in the plant.

● Enters Industrial Field

Harold C. Schott, president of the United States Air Compressor Co., Cleveland, Ohio, manufacturers of automotive service equipment, has announced the entrance of that firm into the industrial field through the addition of a department to be known as the Bowes Coupling & Brass Division. Plans have been formulated for the building of additions to the present factory which will provide greatly expanded facilities in all the company's lines. With the enlarged plant capacity, the company will manufacture and market an extensive line of hose couplings, air valves, blow and spray guns, and miscellaneous hose fittings for industrial plants. The sales department of the new division will be headed by C. A. Bening, long closely associated with the sale of compressed air products.

● New Plant Facilities

The American Chemsol Corp. announces the opening of large bulk plant facilities at Coraopolis, Pa., to service industrial users of cleaning and process solvents. Leonard Messer, recently elected president of the new organization, is a graduate of the University of Pittsburgh. The technical division is headed by Louis Marchetto, also a graduate of the University of Pittsburgh. He has had extensive experience in the laboratory of a leading paint manufacturer and has devoted much time to the study of solvents and their application to industry.

(Continued on page 330)

with CHICAGO "SAFETY PLUS" PRODUCTS

There's no "second reaching" to find a fit when Chicago "Safety Plus" fastenings are used in your assemblies. Dimensional uniformity in Chicago Screw Products is the result of close tolerance testing through each step of production. A thousand fit as perfectly as one.

The Chicago Screw Company has no secret formula for its "Safety Plus" Socket Screw Products —their excellence is simply the result of accurate workmanship and the use of only the finest materials. You'll find them superior in every way.

These Fine Products are sold only thru Authorized Distributors

CHICAGO *"Safety Plus"* line includes:

- Socket Head Cap Screws
- Socket Set Screws
- Stripper Bolts
- Square Head Dog Point Set Screws
- Socket Pipe Plugs
- Keys for "Safety Plus" Products

●

Complete line includes:

- Hexagon Head Cap Screws
- Square Head Cup Point Set Screws
- Headless Set Screws
- Fillister Head Cap Screws
- Flat Head Cap Screws
- Taper Pins
- Milled Studs
- Semi-Finished Hexagon Nuts
- Semi-Finished Hexagon Castellated Nuts

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ADDRESS.....STATE.....

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Learn as fast as you can about KEX quality Wiping Towels. How every square inch of them is usable wiping space—*right out to the very edge.* They are the kind of soft Wiping Towels you can use without fear of marring the most delicate surfaces. They have no buttons, hooks, hard seams or possible ingrained grit that make non-descript rags and waste so hazardous to use. In other words, KEX Industrial Wiping Towels are *manufactured for the very purpose to which you will put them*... and are not cast-offs that have served, and outlived, their purpose.

KEX Wiping Towels absorb up to six times their weight in grease and oil—and give you hundreds of more wipes per pound than make-shift rags or waste.

They are uniform in size and fabric; over-edged to prevent fraying, and are delivered to your plant after they have been cleaned by a special high-heat process—in any quantity desired, as often as necessary.

Get the facts today! There's nothing to buy, no expensive inventory—just a low monthly rental. The very first month should show you considerable saving on wiping costs.

"KEX" NATIONAL SERVICE

REG. U.S. PAT. OFF.

"KEX" REG. U. S. PAT. OFF. NATIONAL SERVICE A CALLAWAY MILLS PRODUCT INDUSTRIAL WIPING CLOTHS

(Continued from page 329)

• Sylvania to Produce Marine Radar Systems

Sylvania Electric's plans to produce, distribute and service commercial marine radar systems were announced by Don G. Mitchell, president, at a luncheon following a private inspection of the new radar installation on the Queen Elizabeth. The radar equipment was explained and demonstrated by Sir Robert Watson-Watt, father of British radar and consultant for Sylvania Electric Products Inc. and A. C. Cossor, Ltd., Sylvania affiliate and producer of the Queen Elizabeth radar.

Mr. Mitchell said that already more than 45 shipping companies have placed orders for from one to 20 similar Cossor radars including the 22,000-ton whaler, James Clark Ross, now in the Antarctic. Some of these sets are for ships well under 1,000 tons.

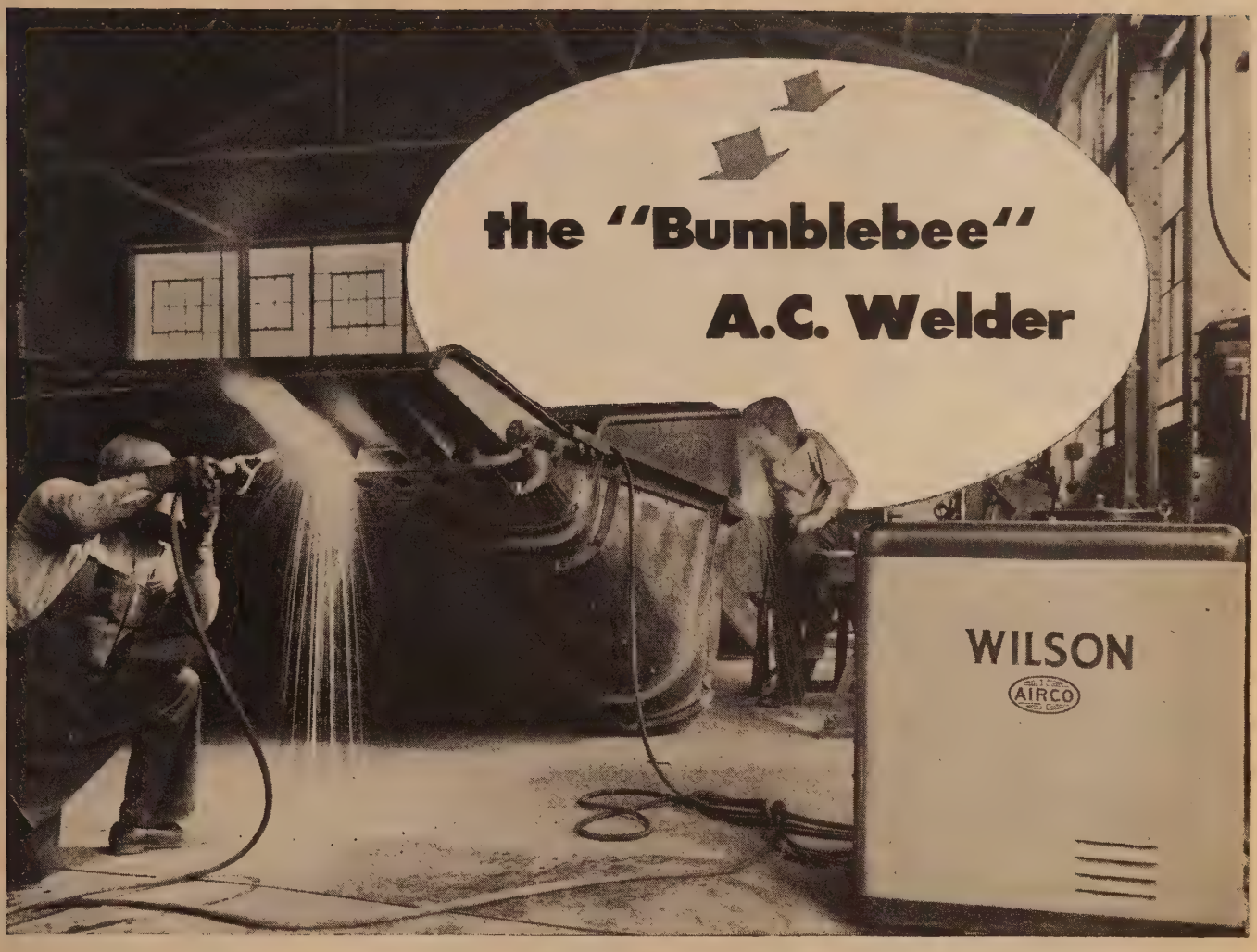
"Entrance into the commercial radar field," Mitchell described as a "logical expansion of the company's activities" since it is "the largest producer of certain critical radar components and is developing and building complete equipments for government contracts. Active participation in the radar art by Sylvania," he continued, "began during the early days of the last war in cooperation with the U. S. and British governments and continued through the development of the most advanced types of very short wave and PPI (plan, position, indicator) equipments."

"About a year ago we became affiliated with the A. C. Cossor group of companies, the largest producers of radar equipment in Great Britain. The purpose of this affiliation was to facilitate the exchange of research findings in the radio, radar and electronic fields.

"One of the first fruits of our agreement with Cossor is the cooperation of Sylvania and Cossor in improving, producing and distributing the commercial radar equipment pioneered by Cossor and now in use on the Queen Elizabeth and several other vessels. Sylvania will cover the U. S. market, furnishing complete engineering facilities for installation and service of Sylvania-Cossor Radar Equipment in U. S. Ports. Sylvania will also build a radar system embodying the best features of both British and American engineering, experience and design.

"We feel that our decision to en-

(Continued on page 332)



GIVES YOU All These Important Operating Features

1. **WIDE CURRENT RANGE** from 30 to 275 amperes for the 200 ampere model; 60 to 375 amperes for the 300 ampere machine; and 100 to 625 amperes for the 500 ampere type.

2. **IMPROVED ELECTRICAL EFFICIENCY** at rated load of 84½%, 81% and 83%, respectively for the 200, 300 and 500 ampere sizes is provided.

3. **LOW OPEN CIRCUIT VOLTAGE** (75 volt) works to greater advantage on new AC electrodes and gives perfect ease of welding.

4. **VASTLY IMPROVED POWER FACTOR** virtually eliminates the penalty charge of low power factor, and permits the use of smaller primary cables, line switches and fuses. This feature also permits the operation of more welders from existing feeders without causing overload.

5. **QUIET OPERATION** because there are no rotating parts in the circuit design. The Wilson "Bumblebee" is almost silent in operation.

6. **MINIMUM MAINTENANCE** because its operation involves no moving parts with the exception of the fan.

These plus values inherent in the advanced design of Wilson "Bumblebee" arc welders make possible *better quality welding with a reduction in power consumption.*

For more information about the complete line of Wilson "Bumblebee" A. C. welders, fill in the coupon below. Send it to: Air Reduction, General Offices, 60 East 42nd Street, New York 17, N. Y. In Texas: Magnolia Airco Gas Products Company, General Offices, Houston 1, Texas. Represented Internationally by Airco Export Corporation.

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Send me copy of your catalog ADW-53.

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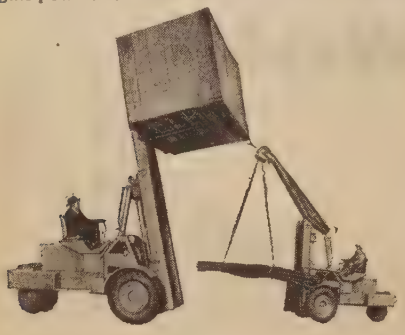
KRANE KAR

SWING BOOM MOBILE CRANE

This rubber tired Boom Crane lifts, carries, and places loads up to 10 tons—of any shape or size—in any part of plant or yard. Travels, swings and tops boom, raises and lowers load—all at the same time or independently. One man operates it, one engine powers it. *KRANE KAR does work of 6 to 8 men.*

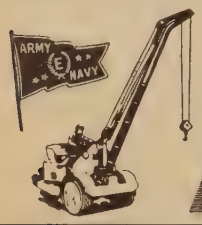


LIFT-O-KRANE

The Combination MOBILE BOOM CRANE and FORK LIFT TRUCK

A MOBILE BOOM CRANE when you have crane work—a FORK LIFT TRUCK when you have pallet loads. For crane work just fold back the forks. For fork jobs simply remove the boom. Also obtainable as a FORK TRUCK exclusively—without boom; or as a BOOM CRANE only—without forks.

Don't depend on human backs. Use POWER EQUIPMENT for carrying, storing, stacking, tiering . . . loading and unloading freight cars, trucks, trailers, barges . . . plant maintenance and repairs. Clamshell Bucket and Electric Magnet available. Write for Bulletin No. 69 on *KRANE KAR*, Bulletin No. 65 on *LIFT-O-KRANE*.



THE ORIGINAL SWING BOOM MOBILE CRANE WITH FRONT-WHEEL DRIVE AND REAR-WHEEL STEER

2½, 5, AND 10 TON CAPACITIES

KRANE KAR

TRADE MARK REGISTERED

SILENT HOIST & CRANE CO., 873 63rd ST., B'KLYN 20, N.Y.

JOHNSON XLO MUSIC WIRE comes to you attractively packaged for convenient handling in units of ¼ lb., ½ lb., and 1 lb. Full range of sizes — .003" to .200". JOHNSON XLO MUSIC WIRE answers the call for high carbon, smooth, round, spring steel wire. Ask us to recommend sizes. If your distributor cannot supply you immediately, please advise.

JOHNSON STEEL & WIRE CO., INC.

WORCESTER ★ MASSACHUSETTS.

NEW YORK AKRON DETROIT CHICAGO LOS ANGELES TORONTO

(Continued from page 330)

ter the radar field is important. The application of wartime-developed radar to peacetime navigation is of great importance to both the future of the radar art and increased safety at sea. But equipment must be simplified for practical use without a staff of trained radar technicians. It must be made unfailing and fool-proof. It must present detailed information at relatively close range. The Cossor equipment on the Queen Elizabeth amply demonstrates how well these new, practical requirements for marine radar have already been accomplished."

Sir Robert Watson-Watt, who recently retired as Vice Controller of Communications Equipment, British Ministry of Aircraft Production, to become scientific advisor for the Sylvania and Cossor Companies, traced the development of radar in Britain from the early 1930's through the Battle of Britain and the final assault on Germany.

The Queen Elizabeth radar is of simplified design with the majority of the equipment hermetically sealed in a steel tank. Three ranges are provided including 1½ miles, 3¾ miles and 15 miles. The equipment is sufficiently discriminating and sensitive to pick up small objects within 150 feet, including the bow of the vessel.

● Rochester Ropes

Rochester Ropes announces transfer of eastern sales headquarters, warehouse and export office to its new building at Water, Jefferson and Cherry Sts., New York 2, N. Y.

● Lodge & Shipley Is Buyer

The Lodge & Shipley Co., Cincinnati, Ohio, has acquired the turret lathe and hand screw machine business of the Acme Machine Tool Co. of Cincinnati William L. Dolle, president and general manager of Lodge & Shipley, announced that this acqisition will make the company the only one in the machine tool business to offer a complete service in the machining of cylindrical surfaces. The purchase did not include outstanding capital stock of Acme, but merely the patents, good will, patterns, trademarks, jigs, fixtures, inventory and associated items comprising the turret lathe and hand screw machine business.

A readjustment of production space facilities will be necessary to

(Continued on page 334)

INDUSTRY PLANS AHEAD *with* CLAY PIPE

BESIDES helping to speed construction in today's booming industrial expansion, Clay Pipe is one of the most important factors in guarding against future plant obsolescence. Today's new factory may change over in a few years to metal pickling, chemical processing or some other manufacturing activity requiring the disposal of strong acid wastes. Where Clay Pipe is specified, such a change will cause no disposal system difficulties. Clay is the *only* pipe that can safely carry all industrial wastes and sewage without decomposing, corroding or rusting. It is the one pipe that is both chemical and abrasion-proof. It always pays to specify *"Clay"* . . . the pipe you can put down to *stay!*

For information on your Clay Pipe problem, write to the closest regional office listed below.

NATIONAL CLAY PIPE MANUFACTURERS, INC.

571 Chamber of Commerce Bldg., Los Angeles 15, Calif.
522 First National Bank Bldg., Atlanta 3, Ga.
1105 Huntington Bank Bldg., Columbus 15, Ohio
111 W. Washington St., Chicago 2, Ill.

CLAY PIPE NEVER WEARS OUT!

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bring production costs down with
HOFFMAN FLOTATION
the only fully automatic
coolant clarification process

Non-stop production is the cost-cutting method provided by Hoffman Flotation equipment. This fully automatic coolant clarification process requires no attention and since waste solids are discharged from the clarifier, this unit requires no cleaning—there are no strainers to become clogged.

These outstanding features are exclusive with Hoffman Flotation Equipment:

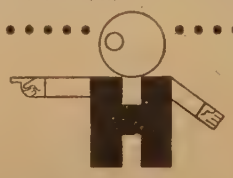
1 Fully automatic—no cleaning of the unit is required.

2 The system is a compact, self contained unit.

3 The action is entirely mechanical—no added material is necessary.

4 The treated coolant is completely clarified.

5 Ideally suited for all machining operations where the coolant is soluble oil and water.



Write today for more complete details

U. S. HOFFMAN MACHINERY CORPORATION
213 Lamson St., Syracuse 6, N.Y.
COOLANT FILTERS • FILTRATION ENGINEERING SERVICE

(Continued from page 332)

accommodate Acme operations in the Lodge & Shipley plant. Until this is accomplished production of the turret lathes and hand screw machines will continue at the present Acme plant under supervision of Lodge & Shipley.

● Silicone Progress

A short resume of silicone progress and a view into the future were presented recently by Dr. W. R. Collings, vice president and general manager of the Dow Corning Corp. at a Hotel New Yorker luncheon.

Silicones, which are semi-inorganic materials, are only four years old. But in that short life a steadily growing variety of useful silicone materials has been produced.

Among those products now available in commercial quantities are silicone fluids which are used as damping and hydraulic fluids, lubricating oils, liquid dielectrics, mold release agents, and high vacuum diffusion pump fluids. Silicone compounds are used as waterproof insulating materials for ignition systems and high frequency communications equipment; silicone greases for special high and low temperature lubrication. The silicone rubber "Silastic" is fabricated into many forms, including heat resistant gaskets, diaphragms, tubing and electrical insulation. Various silicone resins are used as electrical insulating materials, protective coatings, and bonding agents for inorganic laminations.

The properties of these silicones are as follows: ability to perform at temperatures both above and below the limits of comparable organic materials, exceptionally waterproof, water repellent, inability to associate with itself, incompatability with other plastics, anti-foaming agent, and extreme compressability of liquids.

Silicone products have been found to possess excellent insulating qualities for use in electrical equipment. To test the value of silicone insulation, heat and moisture—the two greatest enemies of electrical equipment—were turned loose on motors insulated with silicone resins, asbestos, glass and mica. Silicone insulated motors were forced to work at temperatures ranging up to 590° F—temperatures which would ruin conventional insulation in a few hours.

Even after months of such abuse, the silicone insulated motors did not

fail. Other motors insulated with the best materials previously known were given similar treatment at lower temperatures. The latter failed because the organic resins turned to carbon and became conductors of both moisture and electricity.

Running motors at higher operating temperatures meant that the bearings became hotter and in many tests the bearings failed. Since it became obvious that there would be little advantage in an insulating material able to withstand temperatures beyond the limits of the greases used to lubricate the motor bearings, new highly heat-stable silicone greases were developed.

Silicone insulations are being used in electrical equipment where size and weight are a factor; where reliability under adverse conditions such as high surrounding temperatures or excessive moisture is required; or where periodic overloads cause frequent failure of Class "B" insulation.

● Sales Representative

The appointment of Todd Brothers, 606 N. Field St., Dallas, Texas, as housewares sales representatives for Casco Products Corp., of Bridgeport, Conn., is announced by Jack Schenberg, director of merchandising of the company. Their appointment is in line with Casco's current merchandising activities in conjunction with the expansion of the company's electric heating pad and electri-craft power tool kit divisions.

Todd Brothers, which is directed by Ralph, Walter and Orville Todd, will represent Casco Products Corp. in a southern tri-state area including Louisiana, Arkansas and Texas. With their sales staff, the manufacturer's agents will present all cascomatic heating pads in their territory.

Todd Brothers have a large display room in the Merchandise Mart in Dallas, which serves as their central headquarters.

● Chain Companies United

Purchase of the Woodhouse Chain Works, Trenton, N. J., by the Cleveland Chain & Manufacturing Co., Cleveland, has been announced by David J. Gemmell, vice president in charge of sales of the latter concern.

The Trenton plant will continue in full operation as the Woodhouse Chain Works Division of the Cleveland Chain & Manufacturing Co. E. S. Washburn, present plant

(Continued on page 336)

When something is needed "yesterday"
Specify Air Express delivery

Here's the fastest solution to the problem of supplies and parts that are "fresh out" — get them by Air Express. This super-speedy service places even the most distant supplier only hours from your business.

Speeds up to five miles a minute now make coast-to-coast and overseas deliveries a routine affair for Air Express. And now it's a better value than ever before. The cost of shipping by speedy Air Express is *low*.

Specify Air Express - it's Good Business

- Low rates. • Special pick-up and delivery at no extra cost.
- Direct by air to and from principal U. S. towns and cities.
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Just phone your local Air Express Division, Railway Express Agency, for fast shipping action . . . Write today for Air Express Rate Schedules containing helpful shipping aids. Address Air Express, 230 Park Avenue, New York 17. Or ask for them at any Airline or Railway Express Office. Air Express Division, Railway Express Agency, representing the Airlines of the United States.

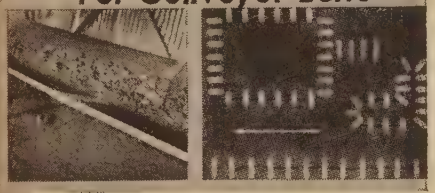
AIR EXPRESS
GETS THERE FIRST

Rates are low
To Air Express a 10-lb. package **1549** miles costs only **$4.65!** Heavier weights are similarly inexpensive. Investigate!

Present Day Practice in Belt Fastening

Every man who has anything to do with the purchase, application or maintenance of conveyor, transmission or V-belts will find the bulletins listed below of considerable value in connection with belt fastening work. A knowledge of present day practice in belt fastening helps reduce the loss in machine hours due to belt failures caused by the use of the wrong type of fastener or improper application. We shall be glad to send any or all of them to you or to any of the men in your organization.

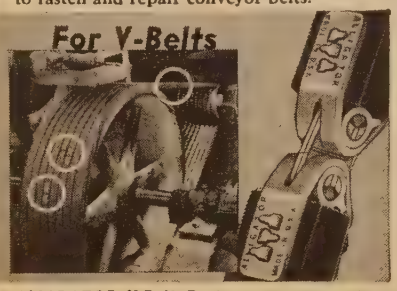
For Conveyor Belts



FLEXCO HD Belt Fasteners are used to make a "water-tight" butt joint in conveyor belts ranging from ¼" to 1½" thick and of any width. The view on the right shows the various types of rips and patches that can be made with these fasteners and Flexco HD Rip Plates.

Bulletin F-100 gives complete details on how to fasten and repair conveyor belts.

For V-Belts



ALLIGATOR V-Belt Fasteners are now being widely used to fasten B, C and D, open-end V-belting of cross woven fabric core construction now being made by most belting manufacturers. The view at the left shows a typical application of these fasteners to a drive where endless V-belts would require dismantling the machinery to put the belts on the sheaves.

Bulletin V-205 gives complete instructions on how to use V-belt fasteners.

FLEX V Fasteners for A and B belts are also available for lighter duty V-belt drives. Ask for **Bulletin V-14.**

For Transmission Belts

ALLIGATOR Steel Belt Lacing is in world-wide use to make smooth, flexible joints in leather, rubber, balata, stitched canvas or solid woven belts up to ⅝" thick and as wide as they come.

Bulletin A-60 tells how to fasten and repair transmission belts.

Sold by Supply Houses Everywhere

FLEXIBLE STEEL LACING COMPANY
4611 Lexington Street. Chicago 44, Ill.

(Continued from page 335)

manager, will remain in the same capacity under the new setup.

Cleveland's acquisition of the Woodhouse plant brings together two of the nation's oldest chain manufacturers. The Cleveland organization was established by the late David Round in 1869 while Woodhouse dates back to 1884. Use of Woodhouse facilities will enable the Cleveland organization to provide improved services to its eastern customers, Mr. Gemmell stated. At the same time, the Woodhouse welded chain line will be augmented by the addition of chain and hoist products manufactured by other Cleveland Chain affiliates.

● New Fluorescent Manufacturer

Electricraft Corp., 42 Clifton St., Newark 5, N. J., has announced plans for full production on a new line of fluorescent lights and fixtures. A newcomer to the field, the company is headed by Gerald J. Henry, president, formerly president of Wheeler Reflector Co., Boston, Mass. Jack A. Lasser, formerly president of Mastercraft Electric of Newark, is treasurer. Products will be marketed under the trade name, Electricraft, and will include fluorescents for most uses.

● Fire Causes Little Delay

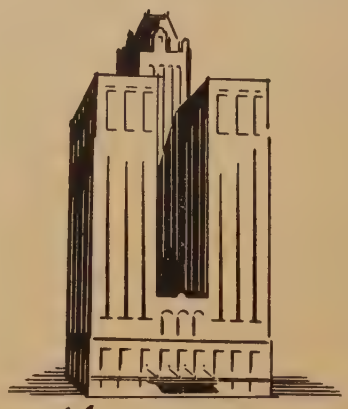
When fire damaged the plant of the Lenk Manufacturing Co., in Newton Lower Falls, Mass., last October 3, its only effect on the Lenk organization was a brief pause in what otherwise would have been a routine day. Before Newton Fire Department officials had declared the fire under control, Col. D. Allen Lenk and his associates had located temporary quarters for the firm and exactly 23 days later the plant was back in production.

Such is the story behind the letter recently sent to customers and suppliers by Col. Lenk as an expression of his personal appreciation of the patience and co-operation the company was shown during the days immediately following the fire.

"Our suppliers are in line for a special bouquet," Col. Lenk said in the letter, "for the way they hurdled obstacles by starting a new supply or raw materials flowing to us within 24 hours after the fire. It is stimulating, particularly when a catastrophe strikes, to know the genuine value of good will flowing from both our customers and our suppliers."

How fast can a screw go? Sounds screwy? It's not! There's a case of a large Eastern manufacturer of electrical appliances (name on request). His assembly line was hopelessly slowed down. Production was hitting new lows when he called in our Engineering Department. We designed new screw parts that could be assembled faster — thereby speeded up production. It also saved him money and resulted in a better product. Perhaps we can do as much for you. It costs nothing to find out.

NEW ENGLAND SCREW CO.
Manufacturers of Special Screws
KEENE, NEW HAMPSHIRE



Host to Most
WHO VISIT BALTIMORE

The largest and newest hotel in Baltimore — run the way you like it. This great hotel offers you 700 fine rooms, excellent restaurants and a pleasant Cocktail Lounge.

Rates are reasonable.

The
LORD BALTIMORE
Hotel
BALTIMORE AT HANOVER
BALTIMORE 3, MD.

• Aro Jobbers Appointed

The appointment of four new jobbers to handle the line of Aro Industrial Air Tools, manufactured by The Aro Equipment Corp., Bryan, Ohio, has been announced by R. W. Morrison, manager of the tool division. These include Grayson-List & Co., Jersey City, N. J., under the supervision of A. B. Schuhl, local division manager in the territory; Erie Manufacturing and Supply Co., Erie, Pa., under the H. B. Parke Co.; Bay State Supply Co., Cincinnati, Ohio, under J. W. Littleton; and Wilkinson-Kompass Ltd., Hamilton, Ontario, Can., under David Hamilton.

• Ladish Changes Name

In order to reflect better the expanded scope of the company's activities, Ladish Drop Forge Co., Cudahy, Wis., has changed its corporate name to Ladish Co. It was felt that the inclusion of the term "drop forge" in the company name may have implied a limitation of products.

• Valve Line Expanded

Expansion of the line of Risselt air eliminator valves manufactured by the Risselt Division of the Lodge & Shipley Company's special products division has been disclosed by William F. Stametz, manager of the valve department.

Added to the Risselt line is a companion valve for industry use and readily applicable to all steam processing. This industrial valve can be applied for high pressure heating up to and including 125 pounds pressure.

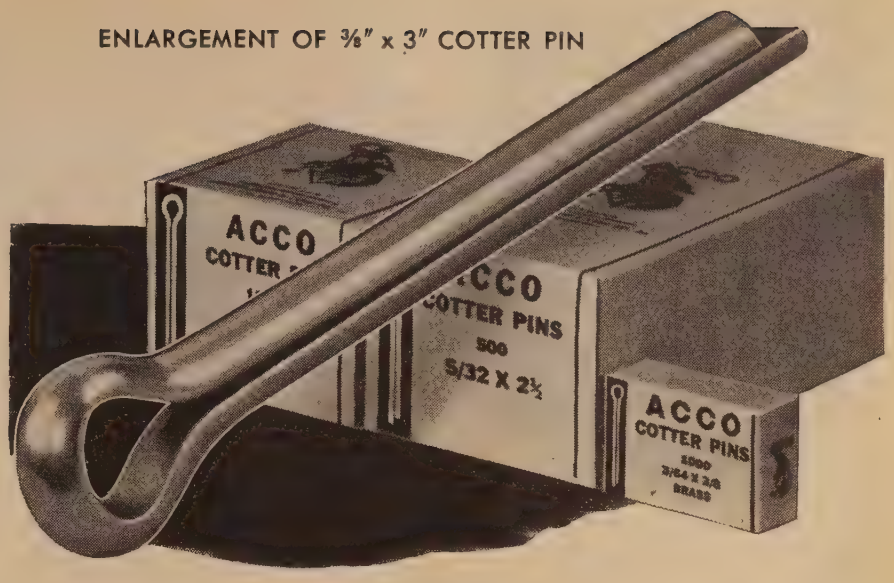
A dealer meeting and sales-merchandising conference for distributors of Risselt valves was held in February at the Lodge & Shipley special products division plant in Cincinnati.

• Agreement Announced

Thomas Robins, Jr., president of Hewitt-Robins, Inc., of Buffalo, N. Y., and Lester H. Buttenheim, president of McKiernan-Terry Corp. of Harrison, N. J., have announced an agreement under which McKiernan-Terry acquires the key sales and engineering personnel, good will, drawings, jigs, fixtures and spare parts of Robins Conveyors' Mead Morrison Division.

Under the agreement, the two companies will cooperate in carrying out important harbor facility projects involving bulk materials handling equipment problems.

ENLARGEMENT OF ⅜" x 3" COTTER PIN



ACCO COTTER PINS ARE MADE TO AMERICAN CHAIN STANDARDS OF QUALITY

There's more to a cotter pin than simple dimensions. ACCO cotter pins are precision-made from accurately drawn wire. They are easy to insert. They fit the hole size for which they are made. Prongs spread easily and hold tight. And they are packed in substantial boxes, clearly labeled.

YORK, PA.—American Chain makes two types of cotter pins in a full range of sizes. In addition to the ACCO (regular type, shown above) American offers the CAMPBELL HAMMERLOCK, which locks positively and permanently by simply striking the head with a hammer—a distinct advantage on a production line.

Look to American for sound quality, whether it is cotter pins—electric or fire-welded chain—any type of weldless chain made of formed wire or stampings—chain fittings, attachments and assemblies—repair links—hooks.

Get in touch with your American Chain Distributor.

ACCO

York, Pa., Chicago, Denver, Detroit, Los Angeles, New York, Philadelphia, Pittsburgh, Portland, San Francisco, Bridgeport, Conn.

AMERICAN CHAIN DIVISION
AMERICAN CHAIN & CABLE

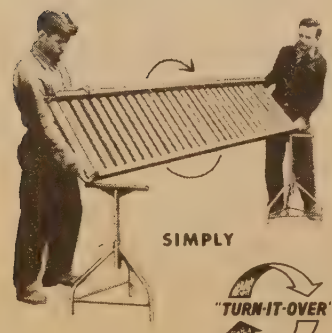
TRADE MARK

In Business for Your Safety

REDUCE THE NUMBER AND TYPE OF CONVEYORS YOU NEED WITH Ferguson "TURN IT OVER" Conveyor

This dual-purpose gravity roller conveyor handles large packages in "SET HIGH" position . . . and by simply turning it over . . . handles small packages within the protective side guard rails in the "SET LOW" position. Its "two-in-one" construction reduces the number and types of conveyors you require . . . saves time and money. Write for detailed information, today.

In "SET LOW" position—channel side-rails form a protective guard.

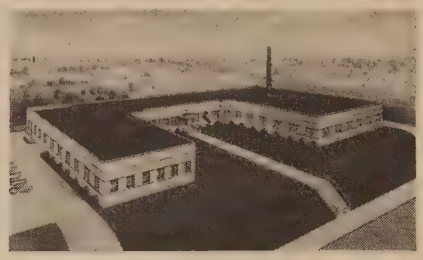


In "SET HIGH" position—elevation of rollers permits the handling of packages larger than the width of the conveyor.

HARRY J. FERGUSON CO.
WHEEL • PORTABLE BELT • BELT AND ROLLER GRAVITY CONVEYORS
131 WEST AVE., JENKINTOWN, PENNA.

NEW PLANTS AND EXPANSIONS

• New Office Expansion



The general sales offices of both the DoAll Co. and the DoAll International Co. celebrated 15 years of continued growth and expansion by moving their entire facilities into new streamlined quarters at Des Plaines, Ill., January 15.

These two companies, with sales-service outlets located throughout the world, had during the past two years outgrown their general office buildings in Minneapolis, Minn. The new location at 254 North Laurel Avenue, Des Plaines, Ill., will provide for the first time the unification of their entire sales activities. Now, together under one roof will be sales, sales promotion, advertising, public relations, direct mail, photographic, billing, and accounting departments.

This move will also bring the company's sales activities more centrally situated among its sales outlets and suppliers of its machine tools and products.

• Goodyear Coast Activities

Further expansion of Goodyear Tire & Rubber Co.'s manufacturing facilities for mechanical and molded goods products is announced by Frank A. Steele, plant manager of the local Goodyear factory in Los Angeles, Calif.

Steele revealed that equipment is to be installed for production of automobile floor mats, and that several thousand small-type tires for toys, lawn mowers and industrial vehicles will be produced daily.

Appointment of Ben Lee Mattingly to fill a new Goodyear post as manager of molded goods sales, Los Angeles, was announced by W. C. Winings, manager of the company's Mechanical Goods Division, Akron, Ohio. Mr. Mattingly has been at St. Marys, Ohio, as sales engineer at Goodyear's molded goods plant. During the war he served overseas as a lieutenant-colonel in the army's chemical warfare service.

Principal mechanical and molded goods items already produced at the

(Continued on page 340)

F and E REPLACES FOUL ODORS WITH BRACING EUCALYPTUS AROMA!

The genuine oil of Eucalyptus gives a fresh, clean tang to F and E, the Dolge deodorant-disinfectant. Wherever foul odors create a problem, F and E does its two-fold job quickly and thoroughly — sweetening the air with fragrant eucalyptus and destroying the SOURCE of noxious odors BY CHEMICAL ACTION UPON MANY PUTREFACTIVE BACTERIA.

F and E is more than a "cover-up"—it's PRACTICAL SANITATION with the added advantage of providing a pleasant, agreeable atmosphere.

Diluted in 10 parts of water, F and E is economical, too, and can be applied with either mop or sprayer. Mopping solutions to which F and E is added do away with unwanted odors and dirt at the same time.

USE F and E HERE
- Toilets and Urinals
- Lavatory compartments
- Dressing Room benches and lockers
- Garbage receptacles
- Hospital commodes
- Stables

—and all other places where effective, pleasant sanitation is required.

Write for folder FE-F745 today.

The C. B. DOLGE CO.
WESTPORT, CONNECTICUT

ALL POSITION Check Valves

CAN'T LEAK

Strataflo
LINE CHECK VALVES
can be placed in any position. Flexible monel metal poppet can't leak. For cold or hot water or steam. 150 lbs. pressure. Ask for bulletin No. 202 on complete line.
Order from your Jobber
WHITE MACHINE WORKS
FORT WAYNE 1, INDIANA

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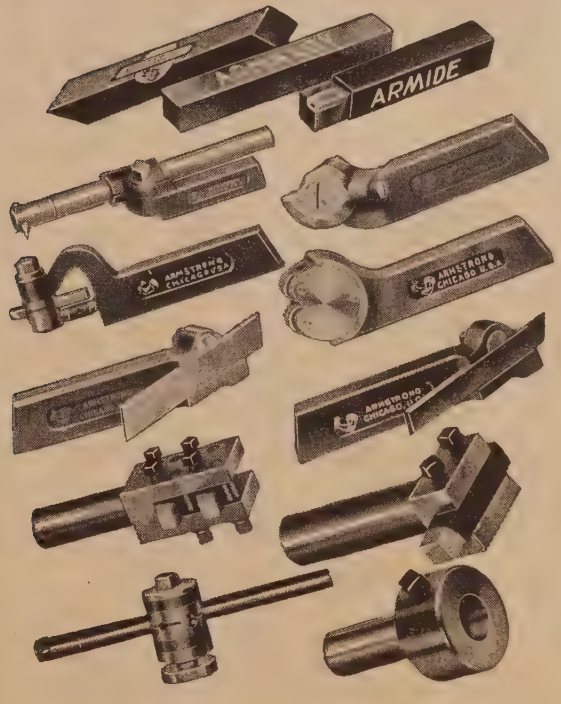

You personally profit from ARMSTRONG TOOL HOLDERS

Whether yours is a "job" or a "position" you are vitally concerned with profits, for it's from profits that wages and salaries are paid. Personally concerned with profits, you should be interested in ARMSTRONG TOOL HOLDERS for they permit extra profits on every operation on lathes, planers, slotters and shapers.

Before ARMSTRONG TOOL HOLDERS, a blacksmith hammered out special tools for each operation, while men and machines stood idle as he fashioned, re-sharpened and re-tempered these cumbersome forgings. Now, with multi-purpose ARMSTRONG TOOL HOLDERS, any mechanic can grind his own cutter-bits from standard high speed steel shapes. Tooling-up is a matter of minutes, with saving of "All Forging, 70% Grinding and 90% High Speed Steel" in direct tool cost.

Today, there are ARMSTRONG TOOL HOLDERS for every operation, including special tool holders for cast-alloy and carbide-tipped cutters. Embodying the "Knowhow" developed through more than 50 years of specialization, they do every operation faster, safer, more accurately . . . at lower cost and a higher profit.

See that ARMSTRONG TOOL HOLDERS are used wherever possible for greater profit. They are catalogued and stocked by all leading Industrial Distributors.

ARMSTRONG BROS. TOOL CO.
"The Tool Holder People"
318 N. Francisco Avenue
Chicago 12, U. S. A.
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Pacific Coast Whse. and Sales Office: 1275 Mission St., San Francisco 3, Calif.

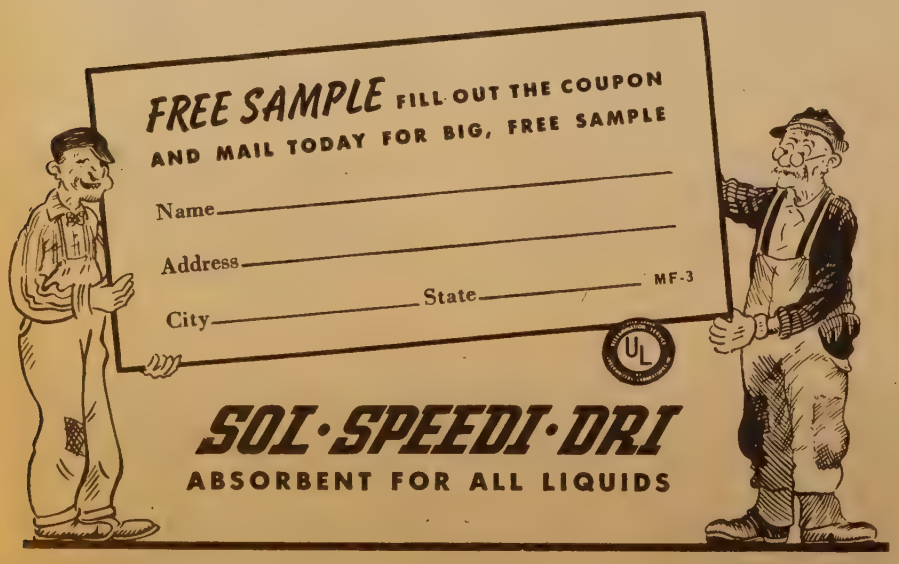
OUT OUR WAY

DON'TCHA KNOW BETTER THAN T'REACH OVER A MACHINE WHEN IT'S RUNNIN'?
I DIDN'T REACH, I SLIPPED-- THERE AIN'T NO SOL-SPEEDI-DRI ON MY FLOOR!
TOO LATE
T. M. REG. U. S. PAT. OFF. COPR. 1944 BY NEA SERVICE, INC.
J.R.WILLIAMS

SOL-SPEEDI-DRI CUTS DOWN ON ACCIDENTS CAUSED BY SLIPS AND FALLS

SOL-SPEEDI-DRI is the fast-working absorbent that soaks up all types of liquids and makes floors clean and safe. It works . . . while you work in safety. Sweep it up and floors are home-clean! Anyone can use it . . . requires no machinery. It's safe, sure, economical.

SUPPLIERS:—*East:* Safety and Maintenance Co., Inc., No. 1 Wall St., New York 5, N. Y.
South, Midwest and West: Waverly Petroleum Products Co., Drexel Bldg., Phila. 6, Pa.



(Continued from page 338)

Los Angeles Goodyear plant are tank car lining and hand-built industrial hose for mining, oil and construction operations. Floor space used during the war for large-scale output of airplane fuel tanks will be utilized for manufacturing the new products.

● Linde Plant In South

The Linde Air Products Co., unit of Union Carbide and Carbon Corp. is constructing a new oxygen filling station and acetylene producing plant in Jackson, Miss. A warehouse for Union Carbide is also being built. The new layout will be just outside the Jackson city limits next to the Illinois Central Railroad. It is expected that the new plants will be in operation by spring.

● G.E. Is Purchaser

The General Electric Company's appliance and merchandise department has purchased a 437,000-square-foot factory at Lowell, Mass., from the War Assets Administration, H. L. Andrews, vice president has announced.

The second Lowell plant to be acquired by the department within six months, the new Marginal Street plant, formerly occupied by the U. S. Rubber Co., will be used for the manufacture of building wire and other electrical construction materials.

The plant will be under the direction of S. T. Powell, manager of manufacturing of the G-E Wire and Cable Division, with headquarters at Bridgeport, Conn.

● New England Plant

Another large industrial plant has been introduced to New England at St. Albans, Vt. It is the plant of National Carbon Co., Inc., constructed for the large-scale production of "Eveready" flashlight cases at a cost of approximately $2,000,000. When the plant swings into its full schedule, approximately 400 workers will be employed.

Many city officials and civic leaders of St. Albans and adjacent communities attended the plant's opening, which was marked by an informal public inspection.

The plant property embraces 56 acres of landscaped grounds, with a highway frontage of 1,750 ft. The plant consists of a main manufacturing building one story in height, providing 80,000 sq. ft. of floor space; a one-story office building

with 6,400 sq. ft. of flooring; a boiler house of 2,000 sq. ft.; a 1,000-sq. ft. garage building, and an oil and solvent storage building of equivalent flooring. Notable are the modern appointments installed in the main building for the convenience and welfare of workers, including a large assembly hall, cafeteria, and locker rooms. The plant was built for National Carbon by the Gillmore-Carmichael-Olson Co., of Cleveland.

The St. Albans plant is the second large industry operated in Vermont by National Carbon. The plant at Bennington, which produced plastic waterproof items to supply military demands during the war, has been converted again to the commercial market and is now making "Krene" plastic products. "Mini-Max" batteries for radio proximity fuses were also made for the armed forces during the war at the Bennington plant.

● Completes Expansion

The modernization and expansion of H. O. Canfield Co. manufacturers of precision rubber parts, is now completed and the plant is in full scale production, Charles Wyman, executive vice-president of the organization, has announced. With the increase in facilities and personnel, the company is now set up to give fast delivery on all rubber parts, even many formerly hard-to-get items like screw and bar bumpers, and lathe cut parts.

● New H & D Factory

After many delays due to difficulties in the construction industry, the new Hinde & Dauch factory, located at 70 Grove St., Watertown, Mass., is now in production. The building is of concrete, brick and steel construction, 200 x 700 ft, one-story box plant and two story office, with a storage basement 90 x 200 ft. The factory has a large recreation room for employes, shower and locker rooms and a well-equipped first-aid room.

● Optimus Companies' Plant

Optimus Equipment Co. engineers and manufacturers of metal washing and drying equipment, and Optimus Detergents Co. manufacturers of industrial cleaning materials, both of Matawan, N. J., are occupying their new enlarged plant at Matawan.

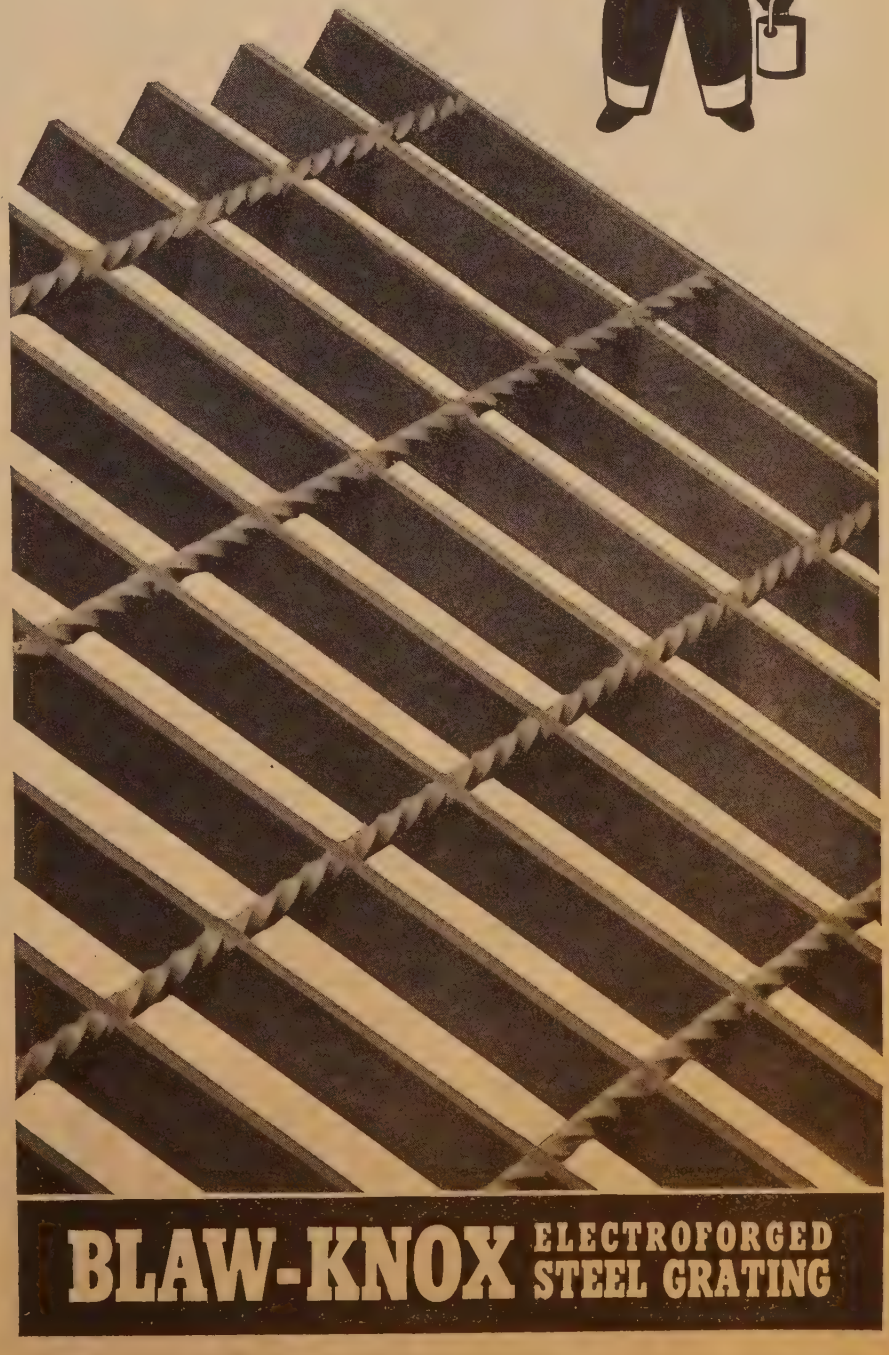
Since their inception two years ago, both companies have been located in the plant of the Hanson-

(Continued on page 342)

It is easy to penetrate every nook and corner of Blaw-Knox Grating with paint. This grating has no acute angles or hidden spaces where corrosion can easily start in the absence of a preservative outer coating.

Painting is a Cinch!

BLAW-KNOX DIVISION
OF BLAW-KNOX COMPANY
2044 FARMERS BANK BUILDING
PITTSBURGH 22, PA.



BLAW-KNOX ELECTROFORGED STEEL GRATING

Dependable Service!

B-RIGHT-ON
Socket Screw
Products

You can depend upon Brighton for quick delivery of all stock sizes; also prompt shipment of special orders. New facilities and new methods of volume manufacture make BRIGHTON Socket Screw Products uniformly excellent . . . unsurpassed for dependability.

Ask your distributor for BRIGHTON Products. If he can't supply you, write to us.

QUALITY B-RIGHT-ON PRODUCTS

The BRIGHTON
SCREW & MANUFACTURING
COMPANY
READING RD. AT DORCHESTER
CINCINNATI 2, OHIO

(Continued from page 341)

Van Winkle-Munning Co. Recently, the buildings of the former Matawan Tile Co. have been purchased for the purpose of providing the two Optimus activities with increased space and manufacturing facilities.

The entire manufacturing facilities of Optimus Detergents will be housed in the new plant, a separate building being devoted to it. All told, the new plant consists of 11 buildings, six of which will be utilized by the Optimus activities, the balance will be occupied to a large extent by the parent organization, Hanson-Van Winkle-Munning Co.

All office, sales, laboratory, design and manufacturing personnel will be located at the new plant, which will be under direction of Allen T. Baldwin, general manager of the two Optimus companies.

● New Plant for Hexacon

Hexacon Electric Co., Roselle Park, N. J., has announced completion of a new factory addition which adjoins the old plant and adds 7000 square feet to present facilities. General offices will continue to be located at West Clay Avenue, Roselle Park.

● Continental Acquires Mill

Continental Can Co. has acquired the net assets of the Hummel-Ross Fibre Corp., of Hopewell, Va., manufacturers of Fourdrinier and cylinder kraft sulphate paper and liner board, Hans A. Eggerss, president of Continental, has announced. The mill will be used to supply raw materials for fibre drum and barrel manufacture in the Van Wert, Ohio and Reading, Pa., plants of The Container Co., one of Continental's principal subsidiaries.

Mr. Eggerss said that the production output of the newly acquired mill will gradually be taken over by Continental in the course of the next six to eight months. He explained that this mill will provide badly needed raw materials to expand fibre drum production.

Fred E. Hummel, president of the Hummel - Ross organization, will serve in an advisory capacity, Mr. Eggerss said, and John W. Sales will continue in his present position as general manager of the Hummel-Ross mill.

● Raybestos-Manhattan Office

Opening of a consolidated office in Cleveland, Ohio, at 1071 Union Commerce building has been announced by Raybestos - Manhattan, Inc. The office will provide better representation and service in that territory and other Cleveland Divisional offices have been combined in this office. The divisions and their representatives at the office include: Manhattan Rubber Division by T. Robinson; Asbestos Textile & Packing Division by D. E. Gow; Equipment Sales Division for Raybestos - Manhattan and the United States Asbestos Division, by E. E. Juergens. Office manager is R. F. Tobin.

● New Office Building

In order to provide much needed additional floor space for both factory and office, the Revolvator Co. manufacturer of material handlings equipment, have completed construction of a new office building at their plant in North Bergen, N. J.

The building which adjoins and is connected with the factory provides commodious private offices for executives and engineers. Adjoining the latter is a large drafting room provided with north daylight.

Former office space in the factory building will be utilized to provide increased manufacturing facilities for which new machinery has been purchased.

● Hayes Buys Company

The Hayes Manufacturing Corp., Grand Rapids, Mich., has become owner of the American Engineering Co. and its subsidiaries. The American Engineering Co. retains its corporate identity as it will not be merged with Hayes.

Rensselaer W. Clark, president, general manager and director of Hayes for the past five years, has been elected president of American and will retain Grand Rapids as his headquarters. Acting general manager, Edgar Washburn, has been made vice president and general manager of American. J. S. Bennett, who became associated with American Engineering in 1919, has been reelected vice president.

(Continued on page 344)

WHY CARRY WHEN YOU CAN CONVEY

Carrying is the oldest form of material handling—modern production demands faster, cheaper and more efficient material handling — conveyors.

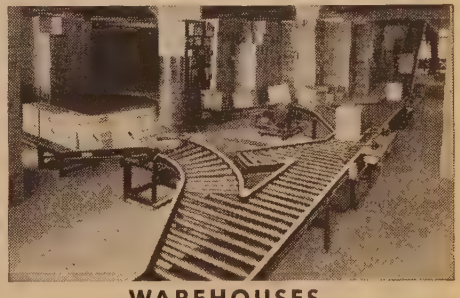
Investigate the use of conveyors. Conveyors handle a wide variety of parts, packages, units, cans, bottles, barrels, bundles, drums and boxes. Available in light, medium or heavy-duty types — portable or stationary — as systems, sections or units — power or gravity fed, they give you remarkable savings in time, money and manpower conservation. They relieve confusion and congestion.

Standard Conveyor Company has the experience and facilities to engineer, recommend and furnish the right type of conveyor for your particular needs.

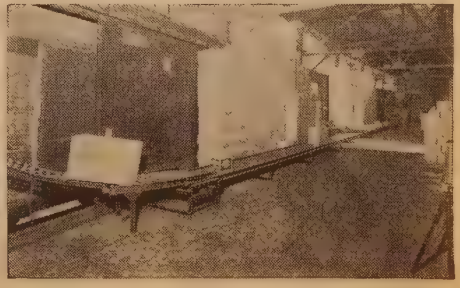
Write today for catalog No. MF-37 "Conveyors by Standard" — a ready reference on conveyor types and systems.

STANDARD CONVEYOR CO.
General Offices: North St. Paul 9, Minn.
Sales and Service in Principal Cities

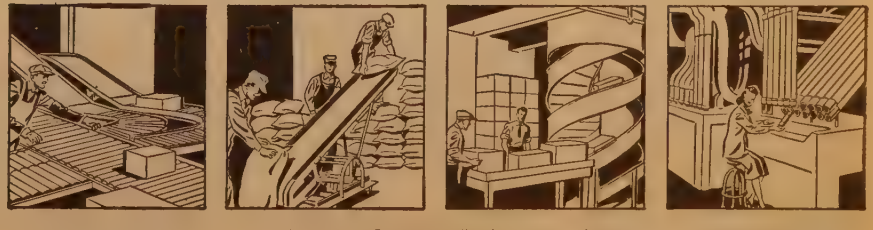
PRODUCTION LINES
No congestion — order and cleanliness when production moves on conveyors.



WAREHOUSES
Merchandise flows in and out of storage with order and system on conveyors.



LOADING DOCKS
Load or unload shipments in half the time with conveyors.



ROLLER - BELT - SLAT - PUSHBAR CONVEYORS • PORTABLE CONVEYORS AND PILERS • SPIRAL CHUTES • PNEUMATIC TUBE SYSTEMS

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SAFETY BELT HOOKS
All the best features of any Belt Lacing.
In sales and performance features, Safety Belt Lacing offers the most.
Only Safety Belt Hooks have the patented binder bars that rigidly hold hook alignment and lap over belt ends to prevent fraying—is suitable for all types of belting.
Safety Belt Lacing can be applied with any standard lacer, a lacing machine—and by using the inexpensive Safety Tu-Way Lacer, can also be applied with a hammer—is suitable for all belt lacing markets.
For the universal, all-purpose, all-market, superior belt lacing, recommend Safety Belt Hooks for volume sales and profits.
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Binder Bars
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PERFORMANCE
IS WHAT YOU WANT!
RECORD
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And performance is what you will get with an Ingersoll-Rand Motorpump. There is a pump available to suit almost every condition. Sizes from ¼ to 40 horsepower to handle from 10 to 1800 gallons per minute at heads up to 600 feet.
The Ingersoll-Rand distributor in your trading area will show you how Motorpumps will make your pumping problems easier.
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11 Broadway, New York 4, N. Y. 9-909

(Continued from page 343)

• New Building

Walter Bender, president of The General Fireproofing Co., Youngstown, Ohio, announces that plans have been drawn and bids are being taken from contractors for the erection of a new building to be added to the south end of the company's Youngstown plant.

The new building will measure 180 ft. by 110 ft. and will contain four stories and basement. It will be of modern steel and concrete construction and will provide the company with an additional 100,000 sq. ft. of floor space.

"The large backlog of orders on hand and the continuing high demand for GF products from all over the world make this additional space necessary if we hope to maintain our present and future position in the industry," Bender stated. He also pointed out that some new products have been developed but before announcing them, space must be found for their manufacture.

It is planned to equip the building with new machinery throughout which will result in the hiring of more employes and in an increase in the volume of business done by the company.

It is hoped that the building can be completed and equipped so as to be in operation by next fall.

• To Build New Plant

Ohlen-Bishop Manufacturing Co. manufacturer of saws and edge tools, has completed plans for the erection of a new plant in Columbus, Ohio, involving an expenditure of considerably in excess of $1,000,000, according to H. K. Hauck, president of the company.

The new plant will be located on a 27-acre tract recently acquired by the company on Kinnear Road, between Kenny and North Starr Roads.

It will include a two-story and basement office building of modern architectural design to house the company's executive, engineering, personnel, welfare, and clerical staff, and a spacious factory area. The factory building will be so planned as to provide for straight-line production and assembly and will be equipped with specially designed furnaces, machinery, and other installations contracted for after careful research and field investigations conducted by members of the Ohlen-Bishop organization.

(Continued on page 346)

COMPETITIVE BID SALE

ABRASIVES

WAA solicits bids for approximately $1,000,000 worth of abrasives of the following types: grinding wheels, abrasive cloth, paper, belts, sticks, stones and hones—all sizes and specifications. The offering includes both new and used materials; inspection may be made prior to bidding at any Regional Office holding the inventory. Priority claims have been satisfied and there will be no delay in delivery.

Sales of Abrasives will be held at frequent intervals. To receive information on future sales, write to the Regional Offices listed below asking that your name be placed on their mailing lists.

BOSTON • PHILADELPHIA • CHICAGO • CLEVELAND
DETROIT • ST. LOUIS • LOS ANGELES

OFFICE OF GENERAL DISPOSAL

WAR ASSETS ADMINISTRATION

GOVERNMENT WAA SURPLUS

Offices located at: Atlanta • Birmingham • Boston • Charlotte • Chicago • Cincinnati • Cleveland • Dallas Denver • Detroit • Fort Worth • Helena • Houston • Jacksonville • Kansas City, Mo. • Little Rock • Los Angeles • Louisville • Minneapolis • Nashville • New Orleans • New York • Omaha • Philadelphia • Portland, Ore. • Richmond • St. Louis • Salt Lake City • San Antonio • San Francisco • Seattle • Spokane • Tulsa

1020

Pick These Blades for Longer Cutting Life

FOR most economical production cutting by machine, the long-life, general purpose GRIFFIN SPECIAL ALLOY molybdenum high speed steel blade is your best buy. Made also in hand frame sizes.

To cut hardest alloys, stainless, chrome, nickel, etc., pick the GRIFFIN HIGH SPEED STEEL blade of 18-4-1 tungsten high speed steel. Power and hand sizes.

In a hand frame blade for general shop use, your best buy is always the improved NEW GRIFFIN. Flexible as a soft-back, tough as an all-hard, this famous non-sagging, non-shattering blade now gives longer cutting life than ever.

For hand-cutting thin sheet, tubing, conduit, etc., pick the GRIFFIN NON-STRIP, with the teeth that do not snap or break off.

For precision contour cutting, pick GRIFFIN BAND SAWS. Choice of Hard edge flexible back, Spring-temper, Skip-tooth and Wood-cutting types.

Write for new 20-page Griffin Price List giving full descriptions, sizes, weights, useful selection tables, etc.

General Sales Agent

JOHN H. GRAHAM & CO. Inc.
Dept. B, 105 Duane St., New York 8, N. Y.

ASK YOUR DISTRIBUTOR FOR

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TRADE MARK

HACK SAW BLADES *and* BAND SAWS

Made by G. W. GRIFFIN CO., Franklin, N. H., Hack and Coping Saw Blade Specialists since 1880

(Continued from page 344)

● Moves to New Plant

The National Twist Drill and Tool Co. announces the removal of all manufacturing facilities to its new Rochester, Mich., plant. A modern building addition houses the operations formerly performed at the company's Detroit plant.

For convenience of local customers, a stockroom and office is still maintained in Detroit at the same address, East Grand Boulevard at Brush Street. Customers outside Detroit are asked to communicate directly with the company's main office in Rochester, Mich.

● Heads New Sales Office

J. S. Gulledge

A new district office of the industrial products sales division of The B. F. Goodrich Co. has been established in Cincinnati and John S. Gulledge appointed district manager.

Mr. Gulledge has been in industrial product sales since he joined the company in 1923. He served as manager of the St. Louis district from 1939 until called to service in the Army Air Forces at the beginning of the war during which he became a colonel. Since rejoining the company he has served as acting manager of the Denver district and on special assignments for the industrial products sales division.

● Victor Record Plant

A new phonograph record manufacturing plant which will greatly increase the capacity of the RCA Victor Record Department is to be established at Canonsburg, Pa., it has been revealed. The RCA Victor Division of the Radio Corporation of America, has leased Building No. 40 of the War Assets Authority's multiple-tenancy project near Pittsburgh.

The building contains 115,000

square feet of manufacturing space, which will be devoted exclusively to record production, supplementing existing facilities in the company's record manufacturing plants.

Announcing completion of negotiations with the War Assets Authority, J. W. Murray, vice president in charge of the RCA Victor Record Department, declared that the company plans to begin immediately the installation of the most modern facilities, which will make the Canonsburg plant the country's model plant for record manufacturing. Production of records at Canonsburg is scheduled to start during the coming summer. Planned as a self-sustaining project, the plant will compound and mix raw materials, process metal parts, press the records, print labels, and test, pack, and ship the final product.

● Jefferson Electric Is Buyer

In a move to facilitate production and delivery of its wide line of transformers, ballasts, and fuses, the Jefferson Electric Co. has purchased the modern plant at Fall River, Mass., used during the war by the Submarine Signal Corp. This new addition was obtained from the War Assets Administration and has a floor area of approximately 250,000 sq. ft. When in full operation it will employ more than 1200 workers. Executive and administrative offices will remain in Bellwood, Ill., and all inquiries should continue to be directed to that address.

● Farnham Acquires Paragon

Edward L. Keenan, executive vice president and general manager, of the Farnham Manufacturing Co., of Buffalo, N. Y., has announced that the entire personnel and assets of Paragon Research, Inc. have been acquired by Farnham.

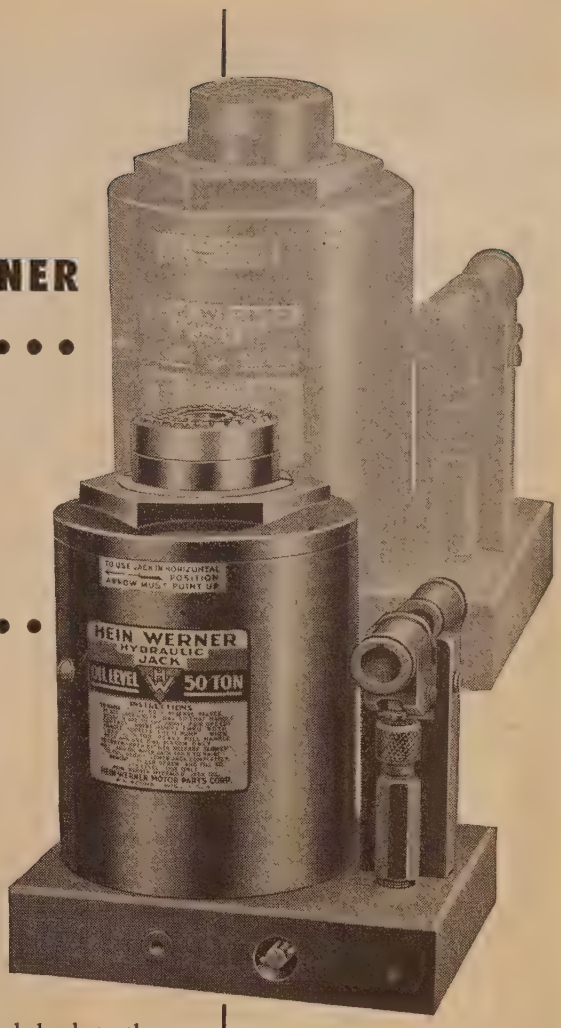
The Paragon Organization did outstanding work during the war years in the aircraft field under the leadership of Paul Dubosclard, president. Since completion of Paragon's war contracts, this organization has not been operating at full capacity, and the management of Farnham has arranged to have its personnel join their company, enlarging their research and engineering departments and utilizing the valuable experience and prestige gained in metal fabricating fields.

Former offices of Paragon, still maintained at 9900 Lincoln Boulevard, Los Angeles, Calif., and 55

(Continued on page 348)

ONE HEIN-WERNER

SELLS ANOTHER



One Hein-Werner Hydraulic Jack leads to the purchase of another when industrial users discover the convenience, dependability and versatility of these powerful, easy-operating jacks.

In a thousand and one applications—lifting, moving, bending, pressing . . . in plant production and plant maintenance, the H-W Hydraulic quickly proves its efficient ability. Every Hein-Werner Jack is factory-tested at 1½ times its rated capacity for absolute dependability and safety.

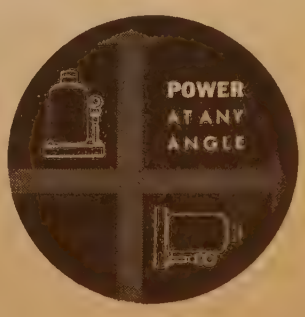
Let an H-W Hydraulic prove its ability to handle any number of tough jobs in *your* plant. Once you've tried one you'll order more. Made in models of 1½, 3, 5, 8, 12, 20, 30, 50 and 100 tons capacity. See your nearest industrial supply distributor, or write us for details.

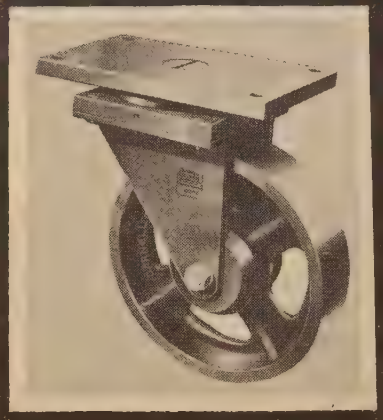
HEIN-WERNER MOTOR PARTS CORP.
WAUKESHA, WISCONSIN

Hein-Werner
HYDRAULIC JACKS

IT'S *MORE* THAN A LIFT!

It is versatility in hydraulic power. It lifts, moves, bends, presses at *any* angle for any job—from vertical to horizontal. The H-W Hydraulic *always* delivers maximum power.





DARNELL CASTERS & E-Z ROLL WHEELS

If you want maximum floor protection, economy and efficiency Demand Darnell Dependability...Made to give an extra long life of satisfactory service . . . .

DARNELL CORP. LTD.
LONG BEACH 4, CALIFORNIA
60 WALKER ST., NEW YORK 13, N.Y.
36 N. CLINTON, CHICAGO 6, ILL.

(Continued from page 347)

West 42nd St., New York City, will become branch offices of Farnham Manufacturing Co. West Coast and metropolitan clients will be served from these offices, by resident engineering representatives.

● Pacific Northwest Plant

Link-Belt Company's Pacific Division, Seattle, Wash., is occupying a newly built plant in Seattle, Wash. The new plant contains a machine shop, larger warehouse facilities, and up-to-date office building. Fred A. Koepf, district manager, and Harvey V. Eastling, manager of engineering sales, with headquarters in Seattle, direct activities of the company in this Pacific Northwest area. The new mailing address is 3405 Sixth Ave. S., Seattle 4.

● New Plant Addition

A new plant addition that will increase the production of paper 100 to 150 tons per day will be constructed for The Gulf States Paper Corp. by The H. K. Ferguson Co., industrial engineers and builders, at Tuscaloosa, Ala.

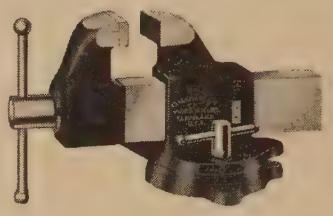
The expansion program is also being undertaken to diversify the type of products manufactured, officials of The Gulf States Paper Corp. said. Included in the new construction will be the installation of a new paper machine, together with the necessary pulp production facilities, recovery capacity and other auxiliaries. The present production rate at the plant is 200 tons per day.

The project, which will also include the construction of a personnel building to serve plant employes, has been authorized to proceed by the Civilian Production Administration. The contract awarded to The Ferguson Co. covers engineering, construction and the installation of process equipment.

● New Plant for Lasser

Lasser Mfg. Co. has acquired a new, larger plant in Miami, Fla. The new building, completely modern throughout, takes in a square block in the southern city and has excellent rail and highway facilities including a private siding on the Florida East Coast Railroad main line. The company manufactures a complete line of fluorescent lights and lamps. General offices will be located in the building at 40 N. E. 22nd St., Miami.

COLUMBIAN VISES



Columbian Vises give better service longer. They are the means of producing bench work better, quicker and more economically. Columbian Vises are designed to assure additional working strength, positive gripping efficiency and easier operation.

Your Columbian Distributor is always ready to help you.

• STRENGTH • WORKMANSHIP
• ACCURACY • DEPENDABILITY

THE COLUMBIAN VISE & MFG. CO.
9024 Bessemer Ave., Cleveland 4, O.

The World's Largest Makers of Vises

SOFT..but Tough!

The NUPLA HAMMER is a hard hitting "softie" which will outlast other soft face hammers many times. The striking surface consists of a new type of self-healing plastic that does not damage delicate parts or finishes. Does not chip or crack, no fire hazard. 5 sizes; 10 wts.

Priced from $1.50 to $11.00

NUPLA PLASTIC HAMMERS

NEW PLASTIC CORPORATION
1017 N. Sycamore Ave. • Los Angeles 38, Calif.

• Personals

Harry K. Clark

▲ **The Carborundum Co.,** Niagara Falls, N. Y., has announced election of Captain Harry Kenneth Clark as executive vice president and a member of the board of directors. Mr. Clark will at first be engaged chiefly with expediting and motivation of Carborundum's expansion program which entails erection of new buildings, modernization of existing structures, construction of a research center at the Niagara Falls plant, and other activities.

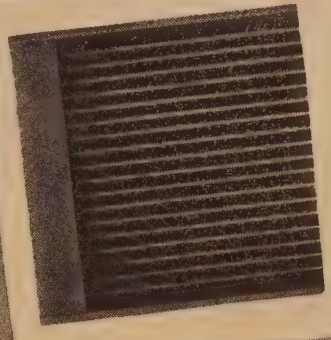
Mr. Clark served as president of the American Supply & Machinery Manufacturers Association in 1940-41. He went to Washington in 1940 to be with the Advisory Committee for Defense and following that was with the Office of Production Management. Later he was commissioned in the Navy and assigned to the Army and Navy Munitions Board. Following that he was directed to establish the Emergency Plant Operations Division, and had charge of 104 plants on V-J day. Prior to his war service, Mr. Clark was vice president and general manager of the Norton Co., Worcester, Mass.

▲ **The Cleveland Tool & Supply Co.,** Cleveland, Ohio, has elected Charles C. Wright as chairman of the board and treasurer of the company. Mr. Wright has been president and treasurer for the past 12 years and has been associated with the company for 37 years. New president is H. E. Ruhf, formerly vice president and active in the company for 41 years. O. C. Wittich, formerly secretary, has been made vice president and secretary. He is also manager of the Grinding Wheel department. J. R. Coventry, who was active in the com-

(*Continued on page 350*)

McCORD
HEATING AND AIR CONDITIONING PRODUCTS

BLAST HEATING COILS — AIR CONDITIONING COILS — ALL TYPES

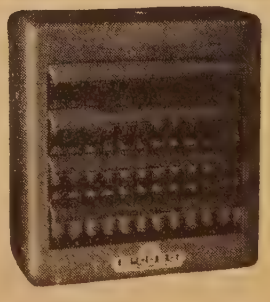


McCord blast coils are the result of many years' experience in the design of heat transfer surface. They meet the requirements for a light weight non-corrodible heat transfer surface with high thermal conductivity. All spiral fin tube construction with tubes formed or bent to permit uniform expansion without strain. Headers are heavy wall construction with tubes brazed into extended ferrules formed in the headers. Fins are helically wound and metallically bonded.

VERTICAL TYPE UNIT HEATERS

A tried and proven heating unit, modern in design. McCord copper spiral fin tube construction creates air turbulence without undue restriction, thus increasing heat transfer capacity. Guaranteed for 150 lbs. saturated steam pressure. Specify McCord.

HORIZONTAL TYPE UNIT HEATERS



Proven, rugged modern design. Quiet, guaranteed for use on No. 150 p.s.i. steam pressure. All copper heating element, individual spiral fin tubes free to expand without strain on joints. Standard motors with standard bases used. May we quote?

McCord CORPORATION
DETROIT 11, MICH.

Are you getting your share of the valuable

MANUALS, CHARTS, BULLETINS and other DATA

offered FREE in

MILL & FACTORY'S "HOW TO DO IT" SECTION

In an average month MILL & FACTORY receives requests for 2,961 manuals, charts, bulletins and other useful industrial data listed in the "How to Do It" Section.

Turn to page 168 of this issue and chart on the card or coupon the items of literature that will help you improve your methods and reduce your costs.

No charge or obligation is involved. Simply encircle the numbers of the items you want, and mail the card. No postage required.

MILL & FACTORY

205 E. 42nd STREET, NEW YORK 17, N. Y.

(Continued from page 349)

pany for five years prior to service in the Armed Forces, is assistant treasurer. W. E. Lowles is general sales manager. He was formerly manager of the Steel Tubing and Stainless Steel department. R. L. Fox is personnel and office manager.

E. W. Ristau

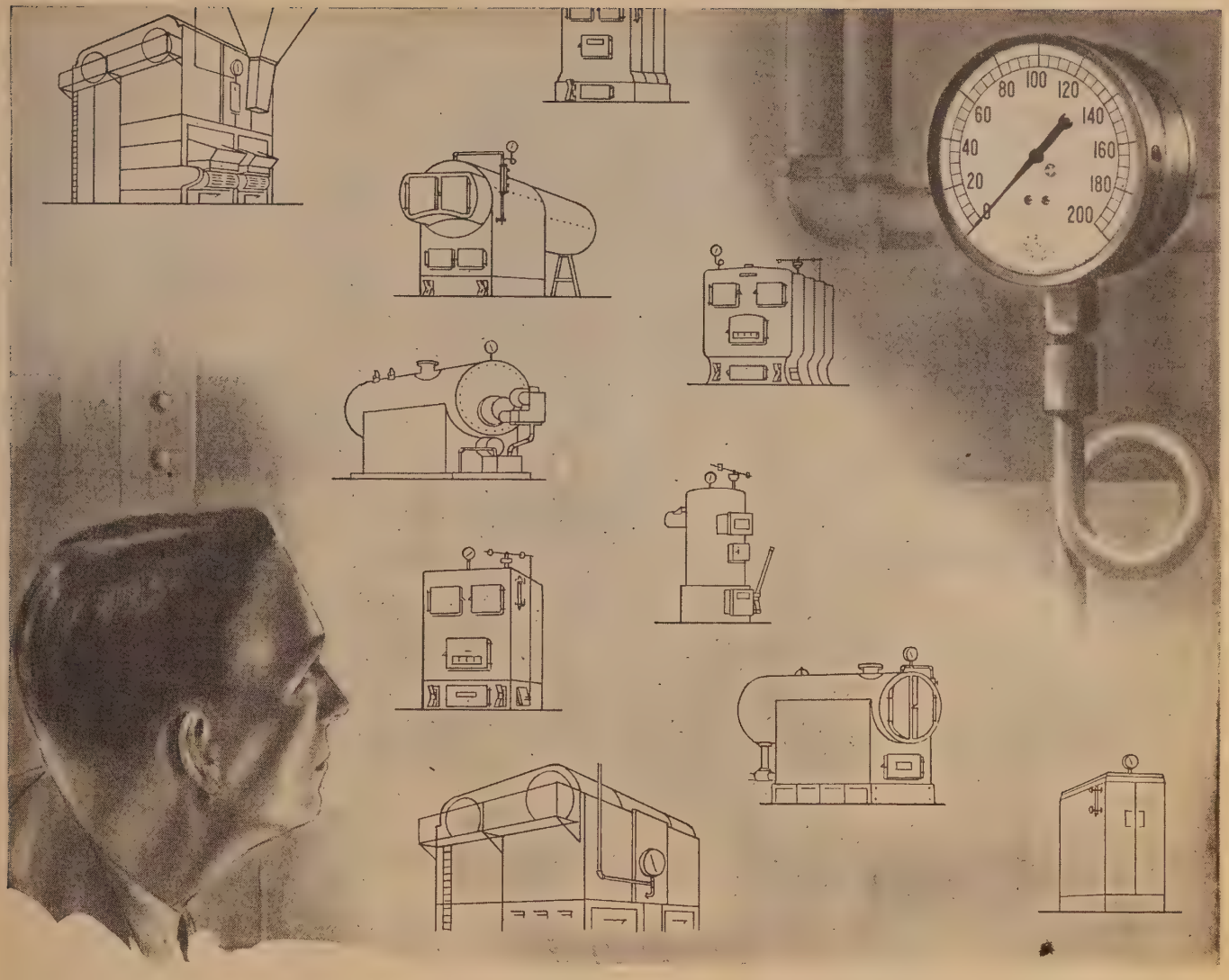
▲ E. W. Ristau, well known among distributors and manufacturers and formerly associated with a leading manufacturer of electric tools, has organized his own company, the **Aristo Power Tools, Inc.**, with headquarters in Chicago, Ill. The company manufactures and distributes drills, grinders, hydraulic presses, special abrasive products, etc.

▲ B. C. Lee, New England representative for **Sprout, Waldron & Co.**, Muncy, Pa., has established residence at 77 Vernon Ave., Middletown, R. I., in order to serve the flour and feed processing industries better in that area.

▲ T. E. Allen, has resigned his position as executive vice president and general manager of the Brake Lining Manufacturers' Association, to assume the newly created post of assistant to the president on public and industry relations for **Thermoid Co.**, Trenton, N. J. He also will assist the vice president of the automotive sales and service.

▲ **Joseph T. Ryerson & Son, Inc.**, has announced appointment of Charles S. Hegel, former manager of the special steels department at the Milwaukee plant, as manager of the Stainless Steel Division of the company. John W. Queen, former manager of the Alloy Steel department at New York, has been made manager of the Alloy Steel Division. G. Van

(Continued on page 352)



. . . *Way out in front in the boiler field*

● Yes, a large majority of boiler manufacturers use Marsh pressure gauges. Marsh is out in front in every branch of this big industry—low pressure, high pressure, cast iron, fire tube, self-contained, water tube—from the smallest up to the largest.

In current trade directories, more than 65% of the boiler manufacturers listed equip their product with Marsh Gauges; and while actual boiler production figures are not available, this particular 65% of the boiler manufacturers unquestionably do, by the most conservative estimate, over 80% of the world's boiler business!

Here is a remarkable tribute to the lasting accuracy of Marsh instruments by men who use gauges in large quantities—men who know pressure gauges forward and backward. Yet it is only one example of the preference shown in many fields by manufacturers of products in which accurate pressure indication is vital.*

Keep this in mind when you buy pressure gauges. Use the instruments that are preferred by the most discriminative users of pressure gauges . . . *Marsh.*

Jas. P. Marsh products include: A full line and range of gauges in pressure, compound, altitude, hydraulic, sprinkler, ammonia, ounce-graduated retard, test, and diaphragm types. Dial thermometers in rigid stem and remote reading types. A broad line of steam and hot water heating specialties. Ask for literature.

MARSH ALONE HAS THE "RECALIBRATOR" —quickest and best way to correct a gauge that has been knocked out of adjustment by improper handling.

JAS. P. MARSH CORPORATION
2029 Southport Avenue, Chicago 14, Illinois

MARSH GAUGES

"THE STANDARD OF ACCURACY"

*** Subsequent advertisements will cite additional examples of this.**

Smooth, Fast, Accurate Lifting, Pushing or Pulling of Loads

CURTIS AIR HOISTS

Because air-powered cylinders lift, push or pull with speed and accuracy, Curtis Air Hoists and Cylinders are cutting labor and production costs. From bakeries to foundries, dairies to automotive parts, Curtis Air Hoists have proved their value in solving many load-handling problems.

- Low original cost—minimum operating and maintenance expense.
- One-man operation—finger-tip control
- Immunity to abuse or overloads
- Light weight—pendant, bracketed or rope-compounded types
- Capacities up to 10 tons

See how Curtis air-operated hoists and cylinders speed production and reduce handling costs. Write for Bulletin C-7 today.

CURTIS PNEUMATIC MACHINERY DIVISION
of Curtis Manufacturing Company
1997 Kienlen Avenue • St. Louis 20, Missouri

CURTIS PNEUMATIC MACHINERY DIVISION H-540
of Curtis Manufacturing Company
1997 Kienlen Avenue, St. Louis 20, Missouri
Please send me Form C-7 on Curtis Air Hoists, Air Cylinders and Curtis Air Compressors.
Name.....
Firm.....
Address.....
City..... Zone..... State.....

93 Years of Successful Manufacturing

(*Continued from page 350*)

Dyke, former head of the Ryerson Special Steels Division, has retired after 30 years of service with the company.

W. H. Williams

▲ W. H. Williams, who with the late P. C. Clark was one of the founders of **The Clark Controller Co.**, Cleveland, Ohio, has resigned as president of the company, which position he has held for the past two years, to become chairman of the board. For 20 years Mr. Williams served as vice president in charge of sales.

R. H. Hoge

Robert H. Hoge, with 20 years of service with the company in various capacities from application engineer through vice president and general manager, has been elected president.

▲ **Norton Co.**, Worcester, Mass., has appointed Everett M. Hicks as assistant manager of the Grinding Machine Division. He was formerly assistant controller. The company has also announced retirement of Howard W. Dunbar, vice president and general manager of the Grinding Machine Division, who became associated with the company in 1913. Mr. Dunbar will continue with the company in an advisory capacity.

▲ **Chain Belt Co.** has appointed Austin K. Thomas as sales manager of its construction Machinery Division. Mr. Thomas was eastern district manager for the company.

▲ Named as manager of the Philadelphia branch of **Jenkins Bros.** is James M. Martin, assistant manager of the branch since 1944. He succeeds Joseph E. Hodgkins who has retired.

▲ **General Box Co.,** Chicago, Ill., announces election of C. Claude Watkins, vice president in charge of purchases, to the board of directors.

▲ **Acme Steel Co.,** Chicago, Ill., has announced the election of C. J. Sharp, former vice president and director of sales, as executive vice president. Other appointments include John Ekern Ott as general manager of consumer products; Allen B. Wilson as general manager of producer products; Guy T. Avery, vice president and manager of products for all plants; B. Richards, assistant to the vice president and manager of production; W. C. Fork, works manager, Riverdale plant.

▲ Appointed as general sales manager of **Greene, Tweed & Co.,** North Wales, Pa., is Howard C. Josephson, formerly assistant to the president of Clark-Babbitt industries. Mr. Josephson also was responsible for the organizing of distribution for the Aluminum Building Products Division of Reynolds-Metals.

▲ E. W. Breese has been named sales manager of the Industrial Division of **Hajoca Corp.** For six years he has been manager of the Newark branch and recently has been zone sales manager for the New York-Newark territory. R. L. Rudulph, whom he succeeds, takes up new duties as assistant general manager of sales for the company.

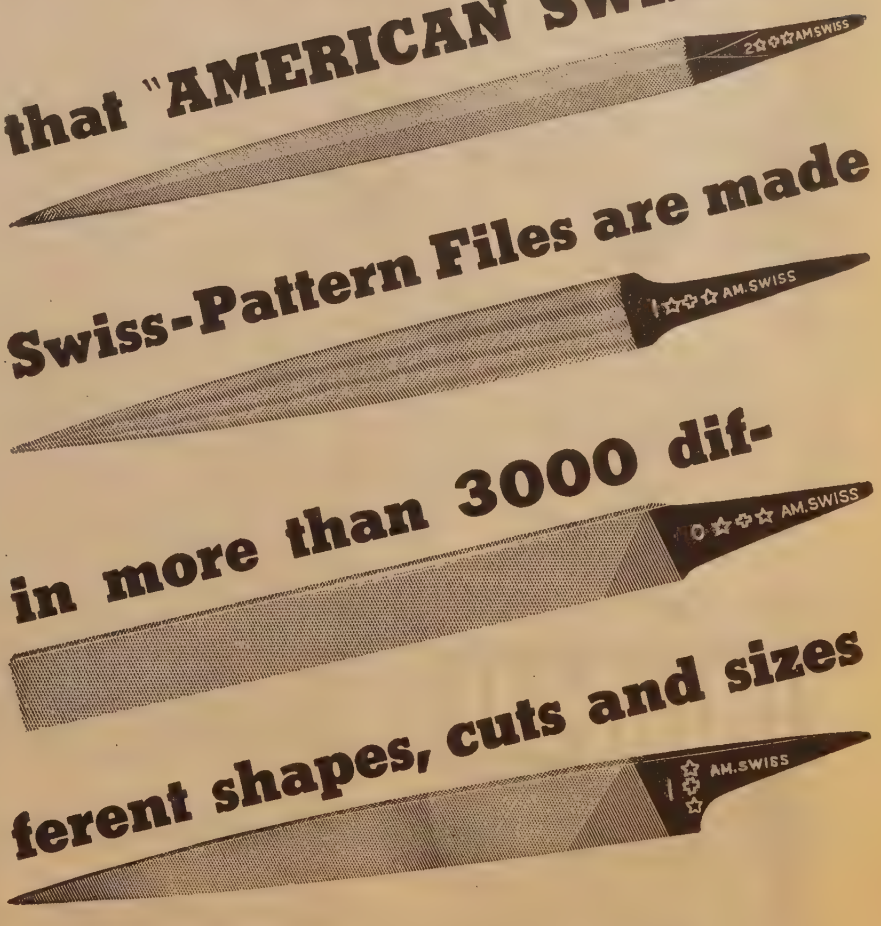
▲ Wm. C. House has been elected as vice president in charge of manufacturing and engineering of the **Lyon-Raymond Corp.,** Greene, N. Y. He has been with the company for 20 years.

▲ **Jones & Laughlin Steel Corp.** has announced appointment of Kier M. Boyd as assistant man-

(Continued on page 354)

Do You Know...

that "AMERICAN SWISS" Swiss-Pattern Files are made in more than 3000 different shapes, cuts and sizes



This wide selection gives you exactly the right precision tool for every intricate or accurate filing job . . . and their sharp, long-lasting teeth assure best results at lowest cost.

AS-133

BUY FROM OUR AUTHORIZED DISTRIBUTOR

American Swiss File & Tool Co., Elizabeth 1, N. J.

ASK FOR THEM BY NAME

American Swiss

SWISS PATTERN FILES

IT CAN HAPPEN

in YOUR plant

IF YOU DON'T SPRINKLE

QUIK-SIL

TRADE MARK

The Modern OIL AND GREASE ABSORBENT

ON OILY, GREASY FLOORS

Now . . . with production volume vitally important you can't afford to gamble with lost manpower hours from floor slipping accidents. QUIK-SIL dries oil and grease with amazing speed. Gives safe footing for workers and makes floors safer for power trucking. Increases leather belting life. Won't harm shoe soles and heels, clothing, hands, floor surfaces. Makes floors easier to clean.

Approved by Underwriters Laboratories Inc., which is sponsored by National Board of Fire Underwriters.

Make Your Own Test with FREE SAMPLE

Just sprinkle QUIK-SIL on an oily spot and note its quick-drying action. Then test the surface for surer footing. Write now!

TROJAN PRODUCTS DEPARTMENT

The Diversey Corporation

53 W. Jackson Blvd., Dept. F-3, Chicago 4, Ill.

(Continued from page 353)

ager of sales, strip and sheet products. Mr. Boyd has been with the company for 20 years. Charles Potter has been made manager of the company's Pittsburgh warehouse to succeed J. M. Hilbish who has retired after 28 years with the company.

Julius E. Graf, former assistant chief engineer of the corporation, has been made chief engineer of the company and its subsidiaries to succeed C. W. Littler who has retired.

▲ New sales manager for the **Lincoln Electric Co.,** Cleveland, Ohio, is W. R. Persons who has had a broad variety of sales experience with the company. In recent years he has been district manager at Pittsburgh.

▲ **SKF Industries, Inc.,** Philadelphia, Pa., announces that William L. Aiken has joined the company as senior division engineer in charge of the automotive and marine department. He was formerly executive engineer of the Autocar Co., Ardmore, Pa.

▲ Promotions in **Eaton Manufacturing Company's** Axle Division include that of Stewart Walls to factory manager and C. C. Wickson to plant superintendent. Both men are employes of many years in the company. Mr. Walls has been superintendent of the division and Mr. Wickson was superintendent of time and study for both Axle plants. The latter position is being assumed by Sigmund Schultz.

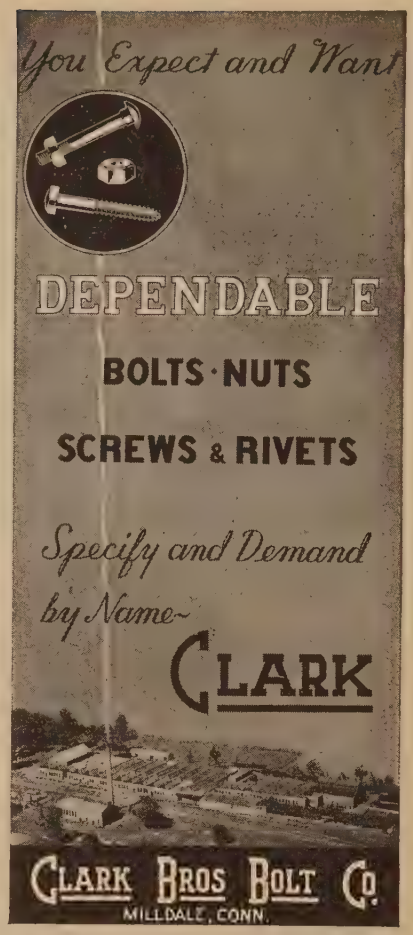
(Continued on page 356)

SALES MANAGER'S ASSISTANT

A fine future open with long established maker of fastening devices.

A real opportunity for a man who is (1) experienced in sales operations through industrial supply outlets; (2) an able sales correspondent; (3) free to travel out of New York headquarters occasionally; (4) willing to "work up" to a major executive post. Salary open. Write fully about your background. Enclose photo. Interview in New York, expenses paid.

Write: Box 361, MILL & FACTORY, 205 E. 42nd St., New York 17, N. Y.



RUBYFLUID FLUX

Best for all Soldering

THE BIG $1 SAMPLE

is more than enough to prove to you that:

Rubyfluid flux spreads evenly and easily to make strong, neat joints—

Rubyfluid keeps the iron in perfect soldering condition while in use—

Rubyfluid produces no fumes harmful to the user.

These are only a few of the qualities that make Rubyfluid liquid or paste flux better.

$1.00 SAMPLE GIVES YOU

1 pint of liquid and ½ pound of paste flux together with helpful, informational booklet "How to Solder". Send for it today. We know—"The Proof's in the Use".

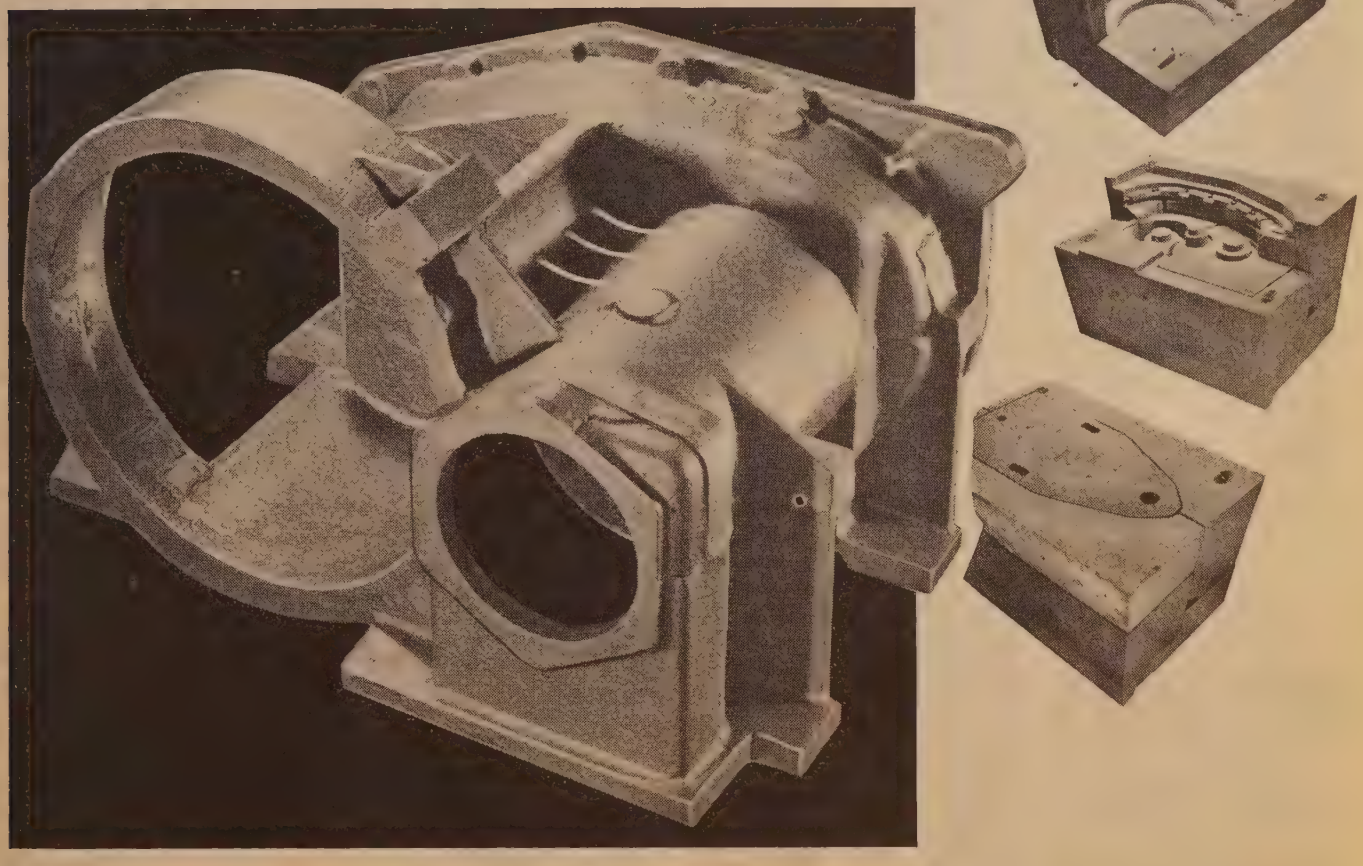
RUBY CHEMICAL CO.

70 S. McDowell St.

Columbus 8, Ohio

Rubyfluid

JIGSAW in sand!



for "DEAD CENTER" accuracy!

CHECK CHART

Send us this information with blueprints to get Unitcastings "geared to the job."

1. The end use of the casting.
2. Will it be welded to component part or frame?
3. Physical properties.
4. Subsequent heat treating.
5. Mechanical tolerances,
6. Processing of casting in your shop before assembly.
7. Estimated quantity at one time and total quantity.

Unitcast's ingenuity often leads to the construction of unusual molds to produce castings in strict compliance with the customers' specifications.

As an example, the mold for this transmission case is pieced together, jigsaw fashion, from eighteen individual baked cores . . . each fitting closely in its place to form an intricate casting demanding "dead center" accuracy! Unitcast's "know how" concluded that this method, unusual as it may appear, would produce a result satisfactory to their standards of quality and uniformity in electric steel castings.

Modern core room and foundry production facilities, available for this type of work, are typical of Unitcast's qualifications to produce the finest electric steel castings. Consult with Unitcast engineers regarding your next steel casting requirements. Unitcast Corporation, Toledo 9, Ohio.

UNITCAST CORPORATION

ALLOY AND CARBON ELECTRIC STEEL CASTINGS

For Precision Soldering

VULCAN
ELECTRIC
SOLDERING
TOOLS

Preferred by mechanics because they have the "hang" or balance a skilled workman likes. Use current efficiently. Low operating cost.

SCREW TIP—for high efficiency—TEN SIZES
PLUG TIP—for low cost replacement—FIVE SIZES

VULCAN ELECTRIC COMPANY
DANVERS 4, MASS.

Makers of a wide variety of Heating Elements for assembly into manufacturers' own products and of Heating Specialties that use electricity.

★

BURNS LONG
BURNS BRIGHT
Uses Little Fuel

DIETZ LANTERNS

R.E. DIETZ COMPANY
1840 NEW YORK 1947

Output Distributed Through the Jobbing Trade Exclusively

(Continued from page 354)

▲ Norris Green of Birmingham, Ala., has been appointed acting field manager of **Thermoid's** Oil Field Products Division to replace Paul Kelting who died last December. Mr. Green has been district manager for Thermoid at Birmingham.

▲ **Signode Steel Strapping Co.,** Chicago, Ill., has appointed J. Milton Moon as sales manager. He has been serving as manager of field engineering and research.

▲ **Cornell-Dubilier Electric Corp.** has announced appointment of Eugene Frekko as chief engineer of the electrolytic division with headquarters in the company's laboratory in South Plainfield, N. J. Mr. Frekko has been with the company for 10 years and succeeds Paul McKnight Deeley, vice president, who has been promoted to manager of the electrolytic plant.

▲ **The Mathieson Alkali Works** has appointed George B. Armstrong as manager of the Carbon Dioxide Division to succeed Charles T. Longaker who has resigned. Mr. Armstrong joined Mathieson in 1934 and recently has been division supervisor with headquarters in Washington.

▲ Robert H. Bishop, director of sales, and Conda P. Boggs, director of manufacturing, have been elected vice presidents of **Sylvania Electric Products Inc.**

OBITUARIES

▲ Clarence Carl Hermann, president and general manager of C. C. Hermann & Associates, Detroit, Mich., died January 20.

▲ De Laval Steam Turbine Co., Trenton 2, N. J. has announced the death of Arvid Peterson, for 20 years chief engineer of the company's centrifugal pump and compressor department.

▲ Lewis Ladd Brastow, first sales manager of the Trumbull Electric Manufacturing Co., and editor of the Trumbull "Cheer," died at his home in Plainville, Conn., January 9 at the age of 72. Mr. Brastow was one of the company's first employes. The "Cheer," to which he has devoted his promotional efforts since 1936 when he gave up sales work, is the oldest house organ in continuous publication under editorship of one man.

SMALL MACHINE PARTS

LCL CARLOADING

WHAT CAN SIGNODE® DO FOR ME!

That's a fair question . . . answered in part by what Signode has done for other shippers. Through long experience, Signode has developed a system of PLANNED PROTECTION that is solving packaging problems. Application of principles using steel strapping to reinforce containers often results in lighter packing weight, elimination of pilferage and reduction in damage claims. This adds up to *lower delivery cost.*

Profit by Signode's world-wide experience. Call the office nearest you or write direct to

SIGNODE STEEL STRAPPING COMPANY

2603 N. Western Ave., Chicago 47, Illinois
363 Furman St., Brooklyn 2, New York
456 Bryant St., San Francisco 7, California
Branches in 21 Principal Cities

THE STEEL STRAPPING METHOD

SIGNODE
Reg. U.S. Pat. Off.

FOR ALL TYPES OF SHIPMENTS

Speed REDUCERS

ONE STANDARD—QUALITY

FOR 37 YEARS . . . Janette has been building high quality machinery under the same management. . . . No compromise with quality has ever been tolerated. ¶Because of this policy, Janette electrical machines have a world wide reputation for reliability, which we believe equals that of any company. ¶Many thousands of our machines are in use 24 hours every day, year in and out, driving vitally important voltage regulators for power lines, fire detection and control equipment, refrigerating machinery, communication power and combustion control apparatus in power plants, factories, stores, office buildings and similar locations.

You Can Safely Rely On Janette Speed Reducers For Your Slow Speed Drives.

Janette

Janette Manufacturing Co. 556 W. Monroe St. Chicago 6, Ill.

REG. U.S. HY-PRO PAT. OFF.

GROUND THREAD TAPS

REDUCE TAPPING COSTS

BY THREADING MORE

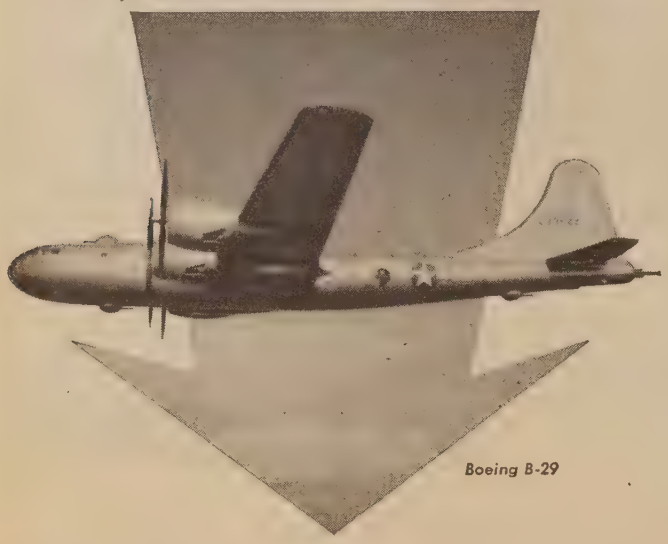
PIECES PER TAP

Start with your tapping operations to cut production costs. Eliminate cut thread taps and use HY-PRO Ground Thread Taps to produce 6 times as many threaded holes—with less sharpening—less breakage — less cost per tapped piece!

PROMPT DELIVERY. Many special as well as standard taps in stock. Send for catalog on company letterhead.

HY-PRO TOOL CO.
New Bedford, Mass., U.S.A.

When Safety Depends on Electrical Contacts



Boeing B-29

the reliable choice is KESTER ROSIN CORE SOLDER

● In the direction-finding equipment of ships and planes . . . in radar—wherever there's no margin for electrical error—permanent, corrosion-free solder bonds are an absolute *must*. And Kester Rosin-Core Solder provides durable electrical contacts that hold fast against shock, vibration, twisting, bending, and the expansion and contraction of temperature extremes.

● In all types of electrical soldering, the same high qualities demanded by aircraft and marine operation are yours when you use Kester Rosin-Core Solder. It means years of freedom from service difficulties. The flux—scientifically balanced with superior alloys—is right in the core, assuring a clean, tight job in one simple operation. Kester Rosin-Core Solder is virtually mistake-proof in application. The rosin-flux will not harm insulation or cause corrosion.

● Equally outstanding for general use is Kester Acid-Core Solder. Both Kester Cored Solders are available in a wide range of strand and core sizes, flux and alloy combinations. Kester engineers will gladly cooperate with you in the selection of a Kester Cored Solder custom-made to solve any special soldering problem you may have. Write fully. There is no obligation.

KESTER SOLDER COMPANY
4218 Wrightwood Avenue, Chicago 39, Ill.
Eastern Plant: Newark, N. J.
Canadian Plant: Brantford, Ont.

KESTER
Cored Solders
STANDARD FOR INDUSTRY

SEE HERE!

YOU BEAT YOUR ANCESTOR 6 TO 1

Say, for the sake of argument you own an axe factory. Your great-grandfather started it back in 1840. A methodical soul, he kept careful count of the number of axes turned out per employes per day.

You go over the old record and find that with 10 employes he averaged 200 axes per 10-hour day. That figures out 2 axes per employe per hour.

Now you check your grandfather's records with what you were getting in 1941. You find your output then was 12 axes per employe per hour. This is just six times what your great-grandfather got back in 1840. Therefore, your productivity is up to par, for the Bureau of Labor Statistics reports that average output per hour in 1941 was 500 per cent above 1840.

Productivity goes up at the rate of about 3 per cent per year. That is, it did until 1941, and then, instead of rising it began to fall, and is now down 10% from its 1941 peak. So if you figure out the number of axes you are getting per employe today you will find it is about 11 instead of the 12 you were getting six years ago.

This is bad, for your hourly pay rate is now half again more than it was then, and you know that if your labor cost forces the price of axes too high, people won't buy as many.

The remedy is more axes per employe per hour. That will enable you to pay the higher wages, sell more axes, and make a profit.

To show you how to make more axes per man hour—or television sets, or washing machines—MILL & FACTORY editors have been engaged for months in an extensive study of this whole subject of productivity. The results of the study will be presented to you in the issue after next—the May issue, which will be called the MILL & FACTORY Productivity Handbook Issue.

It will show you how to increase your hourly production rate by tackling the problem on the four fronts—*Men, Methods, Machines, Materials.* It will not moan nor preach about the decline of productivity. It is a practical tool that you can put to work to get more per hour of work.

Those who have seen the working plan of this Productivity Handbook Issue say, "It is the most useful work ever undertaken by an industrial journal." We think you will agree.

SPACE-SAYING POLYSYLLABIC

"Productivity" is a fancy word, and its meaning is probably fuzzy in many minds. But the "MILL & FACTORY HIGHER-OUTPUT-PER-MAN-HOUR HANDBOOK ISSUE" would take up too much space, so we will stick to the fancy word.

ETYMOLOGICAL INCOMPATIBLES

Another word that we have to interpret to ourselves every time we see or hear it is "unilateral." We mentally translate it as "one-sided" and then it becomes clear. But it is frequently used in company with "agreement" and we are still a little vague as to how an agreement can be one-sided.

GAMBLERS SEEK SAFETY

"One-sided" and "agreement" are as far removed as boogie-woogie and Bach. One cancels out the other. Which reminds us that a couple of weeks ago in

. . . By G. H. Dix

Washington we heard a speaker on housing say that what real estate *speculators* demand is *security*.

At the moment there is much stir in our home city, New York, over a similar yearning on the part of those who make a business of investing large sums in the outcome of sports events. They are accused of attempting to remove their investments from the category of risk capital by committing sports participants to a certain predetermined course. As this is written, the district attorney's office is investigating this understandable desire to escape the whims of fate. His attitude toward the attempt to introduce stability into a hazardous profession is unsympathetic.

OARSMEN'S ENEMY

Speaking of sports, we would like to be enlightened on the following italicized phrase, which appears in an advertisement in Printers' Ink by our contemporary, "Fortune."

"When so explosive a problem as labor hits every man-jack in the nation, it is time to *tighten our oarlocks* and pull."

Many a year has passed since we pulled an oar but in our day oarlocks were not tightened. Obviously the tighter the oarlock the less the pull. A force-fit oarlock would prevent any pull whatever.

Fortune's copywriter is apparently a landsman. Therefore, let him stick to a dry ground metaphor like "shoulders to the wheel."

TRUSS SUGGESTIVE

While we are on this semantical spree we would like to remark on the phrase "when the circuit is ruptured," which we saw in a recent electrical switch advertisement in this journal. We know that "broken" and "ruptured" are synonyms, but a "ruptured circuit" startles us.

NOT JOB-DESTROYERS BUT JOB-MAKERS

An example of semantical astuteness is the avoidance of the phrase "labor-saving" by makers of industrial equipment and materials. "Labor-saving" suggests fewer jobs, when, as a matter of fact, any method, machine or material that increases output per hour makes *more* jobs.

Lower costs mean larger markets—a point on which labor leaders, economists, and manufacturers are in complete agreement.

From the way things look, the Productivity Handbook Issue will likewise be a comprehensive blue book of equipment and materials that will boost your output per man hour. For the makers of the things you buy are cooperating with us enthusiastically. We can, therefore, promise that you will get in one handy volume not only the "how-to" information presented by our editors, but also data on the wherewithal for putting those ideas into effect.

NAMES WITH IMPACT

If unusual names are teamed up the effect is amplified enormously. Take for example the authors of the six articles in the September "American Economic Review." Three of the names are just run-of-mine—Brown, Gordon, and Friedman. But the other three have an anvil chorus ring—Schumpeter, Machlup, and Klopstock.

They should go into business together—Schumpeter, Machlup, and Klopstock—preferably the forging business.

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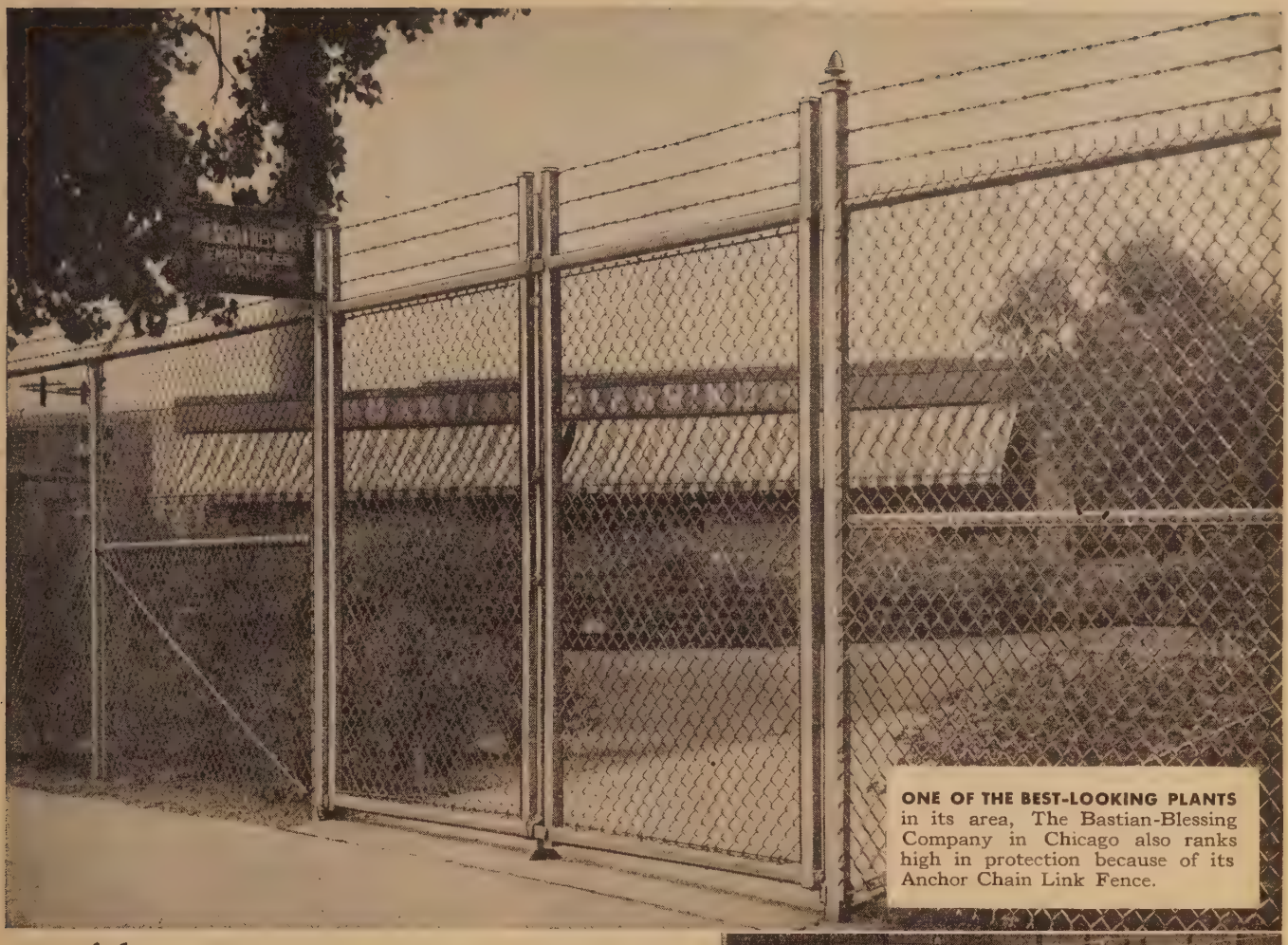

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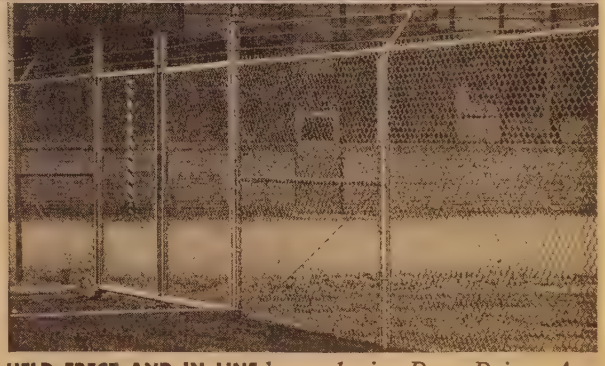

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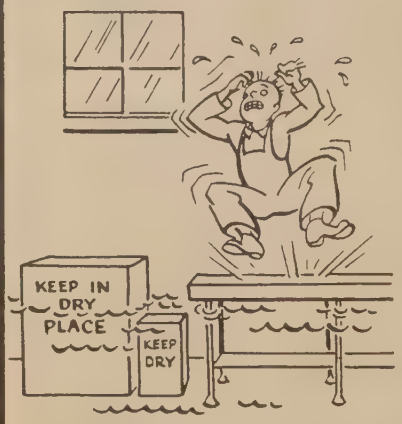

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